

## **Lienminh Chicken Breed: Native Breed and Livelihood of People on District-Island Cat Hai of Hai Phong City, Vietnam**

**Bui Huu Doan, Pham Kim Dang, Hoang Anh Tuan, and Nguyen Hoang Thinh**

Faculty of Animal Science (FAS), Vietnam National University of Agriculture (VNUA),  
Gialam, Hanoi, Vietnam  
Email: bhdoan@vnua.edu.vn

### **ABSTRACT**

In Vietnam, besides the exotic breeds, native chicken is not only more and more plays important role in household economy, but also perform other functions, in support of the cultural, social in the last years and in special in the context globalization in recent future of developing country. The characterization and evaluation of the role of native chicken as Lienminh breed in livelihoods of Vietnamese is necessary for the strategy of conservation and use the native chicken genetic. In order to determine the general information related the status and economic efficiency of Lienminh chickens production. A cross-sectional study was conducted on 30 households who raising Lienminh chicken in Cathai Island by using semi-structured questionnaire. For morpho-biometric characteristics was identify in 200 adult chickens according to FAO standards. For economic-technical parameters was determined on 100 broiler chickens (50 males and 50 females) from hatching to 16 weeks in the hothouse in the same local. The research results show that, about 54% Lienminh breed present in the chicken population in Cathai district, most of them are raised in backyard. The farmer fed average about 30g of feed/day/ chicken. Lienminh breed was characterized by colors, most of the roosters' feathers (95%) were reddish-brown, and light yellow for the female. At the adult's age, the mean weight of male and female were, respectively, 4,0 – 4,3 kg and 3.2 to 3.4 kg. The yield of carcass, thigh and breast meat are respectively, about  $70.53 \pm 3.86$  %,  $18.24 \pm 1.15$  %; and  $17.06 \pm 1.09$  %. The meat quality was especially excellent (evaluate by consumer local) and the price was 2.5 – 3,0 times higher than that of other exotic chicken breeds. The age at the first egg are at 28 weeks; with body weight of about 2.25kg. Mean of Yearly egg numbers were  $75.6 \pm 6.6$  eggs. The rate of hatching eggs were  $85.55 \pm 9.32$ %. The economic efficiency of Lienminh chicken production is higher than others exotic breed, it will increase the income significantly and contribute to poverty reduction for local people.

Key Word: Native Chicken, Morpho-Biometric, Lienminh Chicken Breed, Vietnam

### **INTRODUCTION**

According to the final report of the Committee for Ethnic Minorities and Mountainous Areas, the proportion of poor households in particularly poverty-stricken communes, and villages in 369/690 districts of 50/63 provinces of VN decreased from 35% (2010) to 18.8% (2014). The average income per capita in the communes of the program reached 6.2 million VND/person/year, which was only 15% as much as that in the urban and 21% in the rural areas in the lowland. One of the important income of the island residents is from specific and high-qualified indigenous products. Poultry breeding contributed approximately 50% to the total income of farm households (Maltsoglou & Rapsomanikis, 2005; Burgos et al., 2008). These breeds were high-priced, stable and suitable to the taste of customers thanks to their high adaptability, consistence with cultural practices and farming methods and high quality. Thus, the breeding of indigenous livestock has received due concern from the authorities and been considered one of the important factors not only to stabilize the livelihoods of the people in the island areas but also to protect biodiversity and genetic diversity, contributing to the sustainable development of Vietnam's breeding industry. In

order to create a basis for the recommendation and development orientation for indigenous chicken in general and Lienminh chicken in particular, it is crucial to assess the role of native indigenous breeds (Lienminh chicken) to the people in the Cathai island in the Northeast region of Vietnam. The purpose of research was determined the situation, farming methods and some biological characteristics and the ability to produce the Lienminh chicken in the conditions of backyard farming of the island residents in the Cathai island.

## RESEARCH METHODOLOGY

A cross-sectional study was conducted in order to assess the situation as well as the biological characteristics, productivity of the multi-spurred breeds in the condition of households island residents groups in Cathai island, Haiphong city in the Northeast Vietnam. Thirty residents households who are raising Lienminh chicken in Tranchau commune, Cathai Island, Haiphong city were involved in the research. The chicken breeding conditions and some characteristics related to the distribution, breeding techniques as well as appearance characteristics were assessed through both direct and indirect methods (observe directly and collected by questionnaires) from the households. The characteristics of chicken were described in using the observation directly, photography method from 200 Lienminh chickens following FAO standards.

The productivity of the Lienminh broiler chicken were determined from three lots (n=100) (50 females, 50 males from 0 to 16 weeks of age) raising same condition and free as the actual conditions household. For the chicken from 0 to 3 weeks were housed and fed ad libitum with available feed in local such as corn, rice, soybean and premix. The chicken from 4 to 12 weeks were allowed to go out for grazing and fed on demand 2 meals/day (table 2.1). Carcasses evaluation were determined as the method described by the Working Group 5 of World Poultry Science Association (WPSA, 1984). The data collected is statistically analysed by Minitab 14.

The fertility and productivity of the free-grazing Lienminh hen were evaluated by analyzing the data and information related to the fertility of 100 hens from 20 weeks old which are collected daily by both researcher and farmer). The monitoring indicators included age of first egg laying (day), the average number of eggs/brood and the productivity of a hen per year. The proportion of fertile eggs (%), the percentage of hatched eggs/incubated eggs (%) and the percentage of hatched eggs/fertile eggs (%) was determined on the basis of monitoring 50 nests using natural incubation

Table 1. Experiments design

Item	Description
Household	3
Chickens/household	100
Male/female	1/1
Nourishing time (week)	16
Chickens for Slaughter	5 male and 5 female

## RESULTS AND DISCUSSION

### General information of native chickens production in Cathai Island

The research show that the “Lienminh” chickens breed were the most commonly raised (represent 54.40%) in Cathai island, Haiphong city. Meanwhile, although considered local about the

multi-spurred chickens production but the multi-spurred chickens represent only 45.6%. This results show that Lienminh chickens were rare, and specially received concerns, investment and care. Specially, currently Lienminh chickens are raised free grazing.

The local chicken (Lienminh) is raised in household under a condition scattered, small-scale and extensive, with the popular scale below 50 chickens/households (13.6%) and from 50 to 70 chickens/households (80.4%). There are very few households which raised over 70 chickens (only 6.0%).

In general, male and female Lienminh chicken had average weight about 4.0kg – 4.3kg and 3.2kg – 3.4kg, respectively, well-proportioned body, small and round head, high neck. The appearance traits of Lienminh chickens were somewhat similar to those of Ri chicken, i.e. the feather colors were reddish brown in males (95%) and golden brown or light yellow in females (92%). The majority of both breeds (100%) were single-combed.

Table 2. Population herd of Lienminh chicken in households

Chickens/households	Percent (%)
< 50	13,6
50 - 70	80.4
>71 - 100	6.0

In Cathai Island, the age of the reproductive chickens was relatively old. Reproductive chicken from 2 to 3 years of age represent in 42.17% households and 5.2% households use Lienminh chicken over 4 years for reproduction. The results of this study were similar to those of Moula and et al (2001) when surveying the Ri raising in households which showed that hens were kept for 3 or 5 years for reproduction. As other local good looks, good fertility and productivity to keep as breed for breeding. These habits could be the reason why the production capabilities of this breed were low.

Table 3. The age of the reproductive chickens

Nourishing time (years)	Herd of Lienminh chicken		
	Male	Female	Mean (%)
<2	43.48	40.78	42.17
2 to 3	38.26	37.22	37.74
3 to 4	13.04	16.83	14.93
>4	5.22	5.18	5.20
Total	100	100	100

Addition, all most of household apply the method of freely-grazing. Especially, 80% of the households in Cathai did not build hen-houses only 20% households build chicken house which were mainly made from available rough materials such as wood or bamboo. In these households, in daytime chicken grazed freely and at night they slept under the floor, in a pigsty or on the trees. The absence of hen-houses along with the freely-grazing adopted as main breeding method made it

difficult to manage and prevent diseases. When epidemic occurred, it was impossible to keep the chicken isolated.

The survey results show that 100% of the nursing hens were fed with rice and milled corn as additional feed. Besides, the hens took the chicks out to pick insects, ants, worms, termites, and so on for feed. As for the adult chicken, in daytime they were freely grazing in the surrounding gardens, hills or fields. In the evening, chicken were fed with additional feed available in the household, such as maize, rice, cassava, rice and so on with an average feed of 30g/individual/day. It is remarkable that at harvest times of rice and maize (2-3 times/year) when feed were available, chicken were foraging in nearby rice or maize fields or drying grounds for straw, or corn cobs, dried maize, rice etc. Thus, at such times chicken were not fed with additional food but they still grew up fast with good lookings and were sold with really high price.

#### Vaccination and disease treatment

The study shows that the rearer used Newcastle vaccine and antibiotic for disease treatment 100% and 66% of total households, respectively, especially the rearer did not use drugs for parasites disease treatment. In fact that, with a low hygienic environment, the local rarely occur disease which clearly can be explained because of between of households farm almost is far distant (500 meters) and civil in island rarely buy chicken from other location and their only exchange yields from farm each other.

#### Fertility

The research results showed that hens matured in 197.5 days (at 28.7 week of age) with body weight of 2.25 kg. Lienminh hens laid averagely 12.07 eggs/brood, 5.95 broods/year and 75.60 eggs/hen/year, with the average egg weight of 49.80 g/egg. In general, breed had an below average fertility compared to other indigenous breeds already studied, yet much lower than industrial chicken. Due to the hens' strong instinct of incubation, it was difficult to develop the flock size for large-scaled breedings.

Table 4. Reproductive indicators of female Lienminh chickens

Indicators	Unit	Value(n=50)
		$\bar{X} \pm SE$
Weight of mature hens	kg	2,25 ± 0,74
Age of maturity	day	197,5 ± 23,44
Eggs/brood/hen	egg	12,70 ± 7,06
Brood/hen/year	brood	5,95 ± 1,34
Eggs/hen/year	egg	75,6 ± 6,6
Egg weight	gram	49,8 ± 1,98
Egg morphological indicator	-	0,78 ± 0,32
Yolk	Roche	9-11
Breeding	%	100

Remarkably, the results of field studies also disclosed that 100% of the people in the locality kept the hens for breeding within the flock with an unchanged rooster. In terms of extremely small flock, the inbreeding is unavoidable and considerably dangerous.

In comparison other native chicken, Ho chicken matured in 328.8 days (at 41,1 week of olds) with body weight of 2.56 kg. Ho hens laid averagely 13 eggs/brood, with the average egg weight of 52.53 g/egg. Mia chicken matured in 214.4 days (at 26.8 week of olds) with body weight of 1.72 kg. Mia hens laid averagely 13.4 eggs/brood, with the average egg weight of 42.16 g/egg. (Nguyen Chi Thanh and *et al*, 2009).

Arcoding to Eaton and *etal* (2006) the Ri chicken matured in 204.8 days (at 25,6 week of olds) with body weight of 1.3 kgwith the average egg weight of 45.2 g/egg.H'Môngchicken matured in 167.2 days (at 20,9 week of olds) with body weight of 1.43 kg. H'Mông hens laid averagely 16.53 eggs/brood, and 51.67 eggs/hen/year (Do Thi Kim Chi, 2011).

The result show that the Lienminh chicken reached sexual maturity earlier than other native breeds as Ho chickens but later than Mia, Ri, H'Mông chickens. Weight at maturity age was average. The number of eggs/brood/hen was similar to that of the Ho and the Mia.

The traits of eggs of Lienminh chickens: egg morphological indicator was 0.7-0.8, rather small in size, thin, with shell in white, pinkish or brownish yellow, and dark-colored yolk, which was much to the customers' liking.

The rate of fertile eggs were considerably high (94% - 95%). Due to the natural conditions and instinct of incubation of the hens, the rate of hatched eggs was not very high, only accounting for 84%- 85%. The rate of hatched eggs/fertile eggs was 90% - 91%; and the weight of the newly-hatched was 32g – 35g

Table 5. Fertile indicators of female Lienminh chickens

Indicators	Unit	$\bar{X} \pm SE$	Cv (%)
Fertile eggs	%	93,58 ± 0,59	9,34
Hatched eggs	%	85,55 ± 0,67	11,45
Hatched eggs/fertile eggs	%	90,75 ± 0,47	7,65
Weight of the newly-hatched	g	33,85 ± 0,19	3,76

#### Productivity of Lienminh chicken breeds

The survey result (Table 6) show that Lienminh chickens were at highest risk of death at the first week of age. After 9 weeks chicken hardly die. In 16 weeks, the survival rate is 89.5%. Arcoding to Nguyen Chi Thanh and *eta*, In 12 weeks,the survival rate of Ho chicken, Dongtao chicken, Mia chicken are90.79%, 92%, 76.37%, respectively. In 8 weeks,the survival rate of H'Mông chicken is 78.76% (Tran Hue Vien, 2006) and Ri chicken is 84.5% (Moula and *etal*, 2011).

At 16 weeks of age, the average weights Lienminhmale chickens and female chickens were 1763g and 1553g respectively.The results (Table 7) show that the body weight of Lienminh chicken was similar to H'Mông chicken and Ri chickens at 12 week of olds but lower than other native chicken: the body weight of male Ho chickens and female are 1152g and 1150g,respectively.The body weight of male Dongtao chickens and female are 1386g and 1276g,respectively.

Table 7 shows that the carcass proportion of Lienminh chickens was 70.53%, in which thigh and breast meat constituted 18.24% and 17.06%. The thigh proportion is higher than breast proportion because of the chickens were raising at freely grazing condition. Which is appropriate habits of Vietnamese.

#### Effectiveness of multi-spurred chicken's backyard breeding

Lienminh chicken breed were specialties of Vietnam which were high-qualified, well-sold, high-priced, 2-3 times higher in price than other indigenous breeds.

As local chickens were well-sold with high price, in recent times a number of households were trained how to promote their breeding in order to develop this breed locally. Although the chicken flocks were rather small, they played an important role in the livelihoods of the local people, such as providing meat and eggs as well as being a financial source for many families in cases of emergency: tuition for children, hospital fees and so on.

Table 6. The body weight of Lienminh chickens (n=30)

Week of olds	Value(n=30)			
	$\bar{X} \pm SE$ (grams)		Cv (%)	
1	38,433 $\pm$ 0,133		4,60	
2	86,77 $\pm$ 1,5		4,99	
3	137,83 $\pm$ 1,91		5,39	
4	207,73 $\pm$ 1,56		6,30	
5	270,73 $\pm$ 2,16		5,38	
6	328,03 $\pm$ 1,11		6,58	
	Male		Female	
	$\bar{X} \pm SE$	Cv (%)	$\bar{X} \pm SE$	Cv (%)
7	472,1 $\pm$ 9,1	6,34	465,4 $\pm$ 11,5	5,27
8	573,7 $\pm$ 16,2	5,90	539,8 $\pm$ 10,4	6,33
9	735,1 $\pm$ 15,4	4,64	703,6 $\pm$ 10,1	5,49
10	844,1 $\pm$ 9,96	6,04	826,6 $\pm$ 13,6	6,84
11	953,4 $\pm$ 12,8	7,32	927,1 $\pm$ 12,8	4,39
12	1048,6 $\pm$ 12,2	6,01	1030,4 $\pm$ 9,23	5,55
13	1163,5 $\pm$ 11,7	7,74	1138,2 $\pm$ 9,06	7,38
14	1394,9 $\pm$ 17,8	7,27	1375,3 $\pm$ 7,96	5,06
15	1535,7 $\pm$ 14,3	6,72	1474,5 $\pm$ 11,0	5,36
16	1763,2 $\pm$ 8,85	7,98	1553,6 $\pm$ 18,6	5,21

Table 7. The body composition of Lienminh chicken

Trait	Lienminh chickens (n=5)		
	Male $\bar{X} \pm SE$	Female $\bar{X} \pm SE$	Mean
Body weight (g)	1788,00 $\pm$ 69,74	1594 $\pm$ 57,09	1691,33
Carcass(g)	1255,35 $\pm$ 10,79	1129,35 $\pm$ 11,27	1192,67
Carcass proportion (%)	70,21 $\pm$ 0,11	70,85 $\pm$ 0,15	70,53
Leg muscle weight (g)	230,42 $\pm$ 0,35	204,57 $\pm$ 0,37	217,42
Thigh proportion (%)	18,36 $\pm$ 0,02	18,12 $\pm$ 0,05	18,24
Breast muscle weight (g)	212,72 $\pm$ 0,35	193,85 $\pm$ 0,27	203,35
Breast muscle proportion (%)	16,95 $\pm$ 0,03	17,17 $\pm$ 0,03	17,06
Thigh and breast meat weight proportion(%)	35,31	35,29	35,30

## CONCLUSION

In cathai Island, Lienminh chickens is rare and valuable local breeds which play an important role in the livelihoods of the local people. This chickens breed were the most commonly raised (represent 54.40%) and is raised in household under a condition traditional: scattered, small-scale, extensive and freely grazing condition.

Because of freely grazing condition, the meat quality is excellent, very sweet-smelling and delicious, so the selling price is 2.5-3 times more expensive than that of other chicken breeds. But in the condition of small scale, inbreeding was unavoidable, which was significantly dangerous.

Therefore, if it is adequately supported, backyard farming of Lienminh chicken will bring about high profit and sustainable development, contributing to the sustainable livelihoods of cathai island.

#### REFERENCES

- Burgos, S., Hinrichs, J., Otte, J., Pfeiffer, D. & Roland Holst, D. (2008). Poultry, HPAI and Livelihoods in Viet Nam - A Review. Mekong Team Working Paper No. 2. URL [http://www.dfid.gov.uk/r4d/PDF/Outputs/HPAI/wp02\\_2008.pdf](http://www.dfid.gov.uk/r4d/PDF/Outputs/HPAI/wp02_2008.pdf).
- Do Thi Kim Chi (2011). Morpho-biometric characterisation and performance of H'Mông chicken in Quang Ba ditrict, Ha Giang provice. Animal sciencemaster thesis. Ha noi university of agriculture.
- General Statistics Office (2013), Statistical Yearbook, Statistical Publishing House.
- Maltsoglou, I. & Rapsomanikis, G. (2005). The contribution of livestock to household income in Vietnam:A household typology based analysis. Workingpaper, Pro-Poor Livestock Policy Initiative (PPLPI) 21, Food and Agriculture Organisation. URL [http://www.fao.org/Ag/agaInfo/programmes/en/pplpi/docarc/execsumm\\_wp21.pdf](http://www.fao.org/Ag/agaInfo/programmes/en/pplpi/docarc/execsumm_wp21.pdf).
- Moula, M., Luc, D. D., Dang, P. K., Farnir, F.,Ton, V. D., Binh, D. V., Leroy, P., Antoine-Moussiaux, N. (2011). The Ri chicken breed and livelihoods in North Vietnam:characterisation and prospects. Journal of Agriculture and Rural Development in the Tropics and Subtropics. 112 (1): 57 – 69.
- Nguyen Chi Thanh, Le Thi Thuy, Dang Vu Binh, Tran Thi Kim Anh. (2009). Morpho-biometric characterisation and performance of threenative chicken beed:Ho chicken, Dong tao chicken and Mia Chiken. Journal of Animal Husbandry Sciences and technics.No 4, pp. 2 – 10.
- Ton, V.D., Thang, P.D., Luc, D.D., Son, N.T., Lebailly, P., (2012), Model analysis of consumer demand in Hanoi, Journal of Economic Research Volume 2, pp. 59 – 68.