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Multi-spurred chicken breed and livelihood of ethnic People in North Vietnam: characterisationand prospects

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ABSTRACT: Over the past twenty years, the poultry consumption in Vietnam as well as in many other countries in the world has experienced a great boom. Intensive production has grown rapidly to meet social needs, based on the import of high yielding poultry breeds, which seriously threatens the biodiversity. In Vietnam, there are various rare local chicken breeds, which are a source of livelihood of several ethnic minorities. This study was conducted in 60 households in two communes of PhuTho Provincein North Vietnam to investigate the diversity of the multi-spurred chicken breed and its performance potential. A sample of 200 adult chickens was phenotypically characterized based on the feather colors. Three flocks of fifty broilers were fed on a 12-weeks period fora follow-up of growth performance and ten were used for carcass quality assessment. Moreover, the participating farmers were trained to collect performance data of their flocks and data were recorded by the researcher through a weekly visit, for one year. Nevertheless, the population of this breed in backyard farms in the region does not exceed 16.4% and are raised as scavenging chickens.Feed supplementation was weakly practiced, amounting to 20g feed distributed daily. Plumage colors of the roosters are mainly brown-red (95%). The predominant plumage colors in hens are yellow (27%), dark brown (26%) and grey (20%).Hens of this breed reached sexual maturity at about 28 weeks of age with 1.25kg body weight. Each hen laid on average 73.6±4.6 eggs per year with an average egg weight of 39.7±1.97 g. The main feature of the breed is the additional spurs, giving the Vietnamese name of the breed. 99% of roosters presented 6 to 8 spurs; roosters with 5 or 9 spurs were rare, with 0.5% of the sample. 80% of hens presented 5 to 7 spurs and 20% had 8 spurs. No hen with 9 spurs was observed. In familial farming conditions, multi-spurred hens showed 6.3 ± 0.5 laying cycles per year, 12.6 ± 1.0 eggs per cycle and a mean egg weight of 39.6 ± 2.7 g. The weight of 12 week-old broiler was 1142g/bird.The carcass yield was 68%, while thigh meat and breast meat accounted for 18% and 17%, respectively. 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. The backyard farming of multi-spurred chicken, if it is adequately supported, will bring about high profit and sustainable development, contributing to the sustainable livelihoods of local ethnic minorities.

Keyword: Biological characteristics, multi-spurred chicken, 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 47% (2006) to 28.8% (2010). The per capita income in the communes of the program reached 4.2 million/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 ethnic minorities is from specific and high-qualified indigenous products. Particularly, not to mention a number of indigenous livestock breeds. 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.

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Hence, 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 mountainous 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 multi-spurred chicken in particular, it is crucial to assess the role of these rare indigenous breeds to the people in the Phu Tho (the Dao) in the Northwest region of Vietnam. The research aimed at assessing the situation, farming methods and some biological characteristics and the ability to produce the multi-spurred chicken in the conditions of backyard farming of the ethnic minority communities.

Material and Method

A cross-sectional study was conducted from September 2011 to September 2013 in order to assess the situation as well as the biological characteristics, productivity of the multi-spurred breeds in the condition of households ethnic minority groups in Tan Son District, Phu Tho Province in the North Vietnam. Sixty ethnic minority (Dao) households who raising multi-spurred chicken in Xuan Dai and Xuan Son commune, Tan Son District, Phu Tho Province 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 descripted in using the observation directly, photography method from 200 multi-spurred chickens. The fertility and productivity of the free-grazing multi-spurred hen were evaluated by analysing the data and informations related to the fertility of 50 hens from 20 weeks old which are collected dailly 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.

The productivity of the multi-spurred broiler chicken were determined from three lots (50 chickens per lot, 25 females, 25 males from 0 to 12 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. Carcasses evaluation were determinated as the method described by the Working Group 5 of World Poultry Science Association (WPSA, 1984). The data collected is statisticallyanalysed by Minitab 14.

Results and Discussion

General information of multi-spurred chickens production in Tan Son district

In Tan Son District, the "Ri" chickens breed were the most commonly raised (represent

58.70%). Meanwhile, although considered local development about the multi-spurred chickens production but the multi-spurred chickens represent only 16.40%. This results show that multi-spurred chickens were rare, but not yet specially received concerns, investment and care. Specially, currently most of them are raised free grazing as other local chickens breed. So they were at the risk of cross-breeding and more and more decreasing in number.

Most of multi-spurred chicken are raised in household under a condition scattered, small-scale and extensive, with the popular scale only from 11 to 25 chickens/households (68.52%). There are very few households which raised over 50 chickens (only 3.70%).

The age of the reproductive chickens in this district was relatively old. Reproductive chicken from 2 to 3 years of age represent in 30.90% households and 6.57% households use multi-spurred chickens over 4 years for reproduction. The results of this study were similar to those of Moula 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. This habits could be the reason why the production capabilities of this breed were low.

Most of household apply the method of freely-grazing (98.34 %) and only 1.67% household apply semi-grazing method. Chicken house were mainly made from available rough materials such as wood or bamboo (65.99%). Especially, 29.59% of the households in Tan Son did not build hen-houses. 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 occured, 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 surounding 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 20.34g/individual/day. It it 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.

Morpho-biometric characterisation of multi-spurred chicken

In general, this breed had average weight, well-proportioned body, small and round head, high neck, keen eyes and thick fur (**Table 1**).

Table 1 Morpho-biometric characterisation of multi-spurred chicken (%)

Traits		Multi-spurred *(n=100)*	
		Male	**Female**
Colors of feather	Reddish brown	95	0
	Black	1	27
	Golden brown, dark yellow	3	26
	Gray	1	20
	White	-	5
	Other	-	13
	Total	**100**	**100**
Types of comb	Single	**90**	**10**
	Rose	**7,0**	**8,5**
	Other	**3,0**	**1,5**
Colors of comb	Dark purple	**0**	**0**
	Scarlet	**100**	**100**
Colors of legs	Black	**3**	**5**
	Yellow	**97**	**95**

The appearance traits of multi-spurred chickens were somewhat similar to those of Ri chicken, i.e. the feather colors were reddish brown in males (95%) and golden brown or dark yellow in females. The majority of both breeds (90%) were single-combed, the other had rose comb or other shapes.

Table 2 The number of spurs in multi-spurred chickens

Number of spurs	**Results**			
	Male *(n=83)*	**Ratio (%)**	**Female** *(n=254)*	**Ratio (%)**
5	0	0	12	4,65
6	21	25,30	133	52,33
7	10	12,05	84	33,25
8	51	61,45	25	9,84
9	1	1,20	0	0

Chicken spurs appeared as soon as the chicken were hatched and exists during its lifetime. The numbers of spurs in a multi-spurred chicken were considered the most important trait to determine the value of the chicken. According chicken breeders, the more spurs he chicken had, the more valuable and high-priced. Multi-spurred chickens were a special breed which usually had five spurs

and over. The research results revealed that no males surveyed had 5 spurs, only one had 9, and the rest had 6-8 spurs, accounting for 98,8% of the males. Up to 90.16% of the female had 5-7 spurs and 9.84% of them were eight-spurred. No female had 9 spurs. According to the indigenous habits, nine-spurred chickens were very rare and considered a priceless treasure.

Fertility

The research results showed that hens matured in 196.10 days (at 28.01 week of age) with body weight of 1.25 kg. Multi-spurred hens laid averagely 12,06 eggs/brood, 6,30 broods/year and 73.60 eggs/hen/year, with the average egg weight of 39.70 g/egg. In general, breed had an 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 3 Reproductive indicators of female Multi-spurred chickens

Indicators	**Unit**	**Value** *(n=50)*
		$\overline{X}$ **± SE**
Weight of mature hens	kg	1,25 ± 0,15
Age of maturity	day	196,10 ± 25,13
Eggs/brood/hen	egg	12,06 ± 1.00
Brood/hen/year	brood	6,30 ± 0.50
Eggs/hen/year	egg	73,60 ± 4,60
Egg weight	gram	39,70 ± 0,97
Egg morphological indicator	-	78,01,16 ± 1,05
Yolk	Roche	10-11
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.

It can be seen that multi-spurred chickens reached sexual maturity earlier than other local breeds as Ri, Mia. Weight at maturity age was low. The number of eggs/brood/hen was similar to that of the Mia, the Ho but higher than the Choi. It was also revealed that the egg weight of the multi-spurred chickens was much lower than that of the others.

The traits of eggs of multi-spurred 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 (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%. The rate of hatched eggs/fertile eggs was 91%; and the weight of the newly-hatched was 28g.

Productivity of multi-spurred chicken breeds

Chickens were at highest risk of death at the first week of age. After 9 weeks chicken hardly die. In 12 weeks, the survival rate is 90.2%. At 12 weeks of age, the average weights of multi-spurred chickens were similar Ri breed (1140.43g). The carcass proportion was 68.75%, in which thigh and breast meat constituted 18.05% and 17.12%.

Effectiveness of multi-spurred chicken's back-yard breeding

Multi-spurred chicken breed were specialities of Viettnam which were high-qualified, well-sold, high-priced, 2-3 times higher in price than other indigenous breeds.

As for multi-spurred chickens, the more spurs the chickens had, the higher the price was. The price for chickens with 5-6 spurs was 250 – 270 thousand dongs, for those with 7-8 spurs was 300 – 320 thousand dongs/kg. 9-spurred chickens were believed to bring good luck, thus they were considered extremely valuable and not for sale.

As multi-spurred 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. The chickens were mainly sold to the merchants who purchased local agricultural products and brought to the lowland for sale with high price.

Conclusion

Multi-spurred chickens is rare and valuable local breeds which play an important role in the livelihoods of the local people. 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, back-kyard farming of multi-spurred chicken will bring about high profit and sustainable development, contributing to the sustainable livelihoods of local ethnic minorities.

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