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GROWTH, PRODUCTIVITY, AND MEAT QUALITY OF MNU BUON CHICKENS RAISED IN VIETNAM

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ABSTRACT: This study was conducted to evaluate the growth, carcass characteristics, and meat quality of the Mnu Buon chicken breed (a native breed) raised in Dak Lak province. A total of 200 one-day-old chicks were raised in confinement with a sports field to monitor cumulative growth, absolute growth (ADG), survival rate, feed efficiency, carcass characteristics, and meat quality. The Mnu Buon chickens adapted well to household farming conditions in Dak Lak, with a high survival rate of 91.5%. On Mnu Buon chickens belong to a group of native chicken breeds with small size and medium weight. At 1 day old, the chickens weigh 23.1g/chick, and at 24 weeks old, they reach a weight of 1572.8g (males) and 1233.8g (females). The absolute growth of the chickens gradually increases from week 1 to week 16 and then gradually decreased, absolute growth from 1-24 weeks old reaches 9.2g/day (males) and 7.2g/day (females). Feed intake of Mnu Buon chickens was at an average of 45.4g/day (males) and 39.7g/day (females). Feed consumption per kg of weight gain was 4.9kg (males) and 5.4kg (females). The carcass yield, thigh meat, and breast meat yield of Mnu Buôn broiler chickens were average compared to other native chicken breeds in Vietnam. The breast meat color (CIE L*, a*, and b*) of the chickens was higher than some other native Vietnamese chicken breeds. The breast meat of the chickens has an average shrinkage rate during cooking compared to other native chicken breeds. In summary, the Mnụ Buôn chicken breed has several unique characteristics and many advantages in meat quality, high adaptability to the rearing conditions in Dak Lak, and this information can be helpful for breeders and consumers who prefer high-quality and healthy chicken meat.

Keywords: Carcass Characteristics; Growth Performance; Local breeds; Meat Quality; Mnu Buon Chicken.

INTRODUCTION

Native chicken farming is facing many negative impacts from heavy competition with high-yield imported breeds, climate change, the shifting to industrial farming methods, and increasing diseases (Kpomasse et al., 2023; Mogano et al., 2025). Therefore, many countries have exploited the genetic resources of native chicken breeds to respond to these negative effects and aim for sustainable farming development (Chebo et al., 2022; Kanyama et al., 2024). Choo et al. (2014) argued that native chickens adapt better to areas with unfavorable natural conditions and harsh climates. Berthouly-Salazar et al. (2010) stated that native chickens are easy to raise, may possess disease-resistant genes, and their products are favored by consumers.

Minh et al. (2022) studied the conservation of the genetic resources of Mong ethnic chickens in Dong Hy and Vo Nhai districts, Thai Nguyen province, aiming to select and preserve this breed of chicken to maintain valuable genetic resources for effective exploitation and development of the ethnic chicken breeds. The Mnu Buon chicken is a native breed domesticated and raised in ethnic minority communities in Dak Lak province. Mnu Buon chickens have a small stature, slim bodies, small heads, and small legs. Both adult males and females have a tuft of feathers on their heads. Adult roosters mostly have dark red feathers (plum-colored), shiny yellow hackle feathers around the neck, well-developed single combs, and long tails. Most hens have ash-gray feathers with black streaks, which are clearest around the neck, while others have colors like black, white, "hoa mo" (speckled), or dark yellow. Newborn chicks usually have light yellow or light brown feathers, and some have black stripes. The tuft of feathers on the head at birth is a physical feature used to identify the breed. This breed is highly adaptable to the farming conditions of ethnic minorities in Dak Lak. They are excellent at foraging for food in nature. Mnu Buon chickens are raised on a small scale for self-sufficiency, serving daily food needs and local festivals. Their meat quality is fragrant and delicious, making them popular with consumers.

Quentin et al. (2003) noted that diet concentration affects growth, but carcass composition and some meat quality parameters do not change significantly. Only meat color changes due to diet, mainly because of carotenoid content. The ability to change the carcass composition of broilers without significantly changing growth performance is very limited or

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non-existent. Ngo et al. (2021) showed that "Many toed" chickens (another native breed) have a survival rate of 90.70% – 90.90%, with adult body weight reaching 1693.02g – 1702.6g per bird. The feed conversion ratio (FCR) per kg of weight gain up to 22 weeks of age is 4.97kg and 5.01kg. The carcass percentage is 74.25% - 74.68%, breast meat rate reaches 15.06% - 15.14%, and thigh meat rate is 15.69% - 15.83%. This study aims to evaluate the growth, productivity, and meat quality of the breed, providing a basis for selecting and exploiting the valuable genetic resources of this chicken.

MATERIALS AND METHODS

This experiment was conducted on 200 Mnu Buon chickens (a native breed) from 1 to 24 weeks of age. The chickens were raised at the Buon Ma Thuot Livestock Service Cooperative's farm in Dak Lak province.

Animal experiments

A total of 200 one-day-old Mnu Buon chickens were fitted with leg bands and wing clips. The chickens were raised in naturally ventilated coops with a bedding layer of rice husks. They were fed a complete mixed feed according to Vietnam standards 2265:2007, with a free-feeding regime. Metabolizable energy (ME, Kcal/kg feed) and protein content (CP, %) in the diet were provided according to the growth stage of the chickens, specifically: 22% CP and 3,000 Kcal ME for the period from 0 to 4 weeks of age; 18% CP and 3,000 Kcal ME for the period from 5 to 10 weeks of age, and 16% CP and 3,030 Kcal ME for the period from 10 to 24 weeks of age. During the first 4 weeks, the chickens were raised in cages, and from the 5th week onwards, they were allowed to roam freely in the yard during the day.

Monitoring

Monitor the number of live, dead, and culled chickens from 1-24 weeks to calculate the survival rate. Weight (g): Weigh chickens from 1 day old to 24 weeks old, once every two weeks, weighing each individual chicken in the morning before feeding. 1-day-old chickens are weighed using a technical scale with an accuracy of ±0.05g; 1-4 weeks old chickens are weighed using a 2kg dial scale with an accuracy of ±2g; 5-24 weeks old chickens are weighed using a 5kg dial scale with an accuracy of ±5g. Cumulative growth, absolute growth, survival rate, and feed efficiency were calculated according to Doan et al. (2011). Productivity and meat quality indicators were also determined according to Doan et al. (2011). Daily feed intake (g/animal/day): The amount of feed given each day was weighed, and the remaining feed was weighed the following day to determine the total feed intake. Feed efficiency was assessed by the amount of feed consumed per 1 kg of weight gain at 1, 2, 4, to 24 weeks of age.

Meat yield and quality

Survey slaughter: Ten roosters and ten hens with average weight at 24 weeks of age were selected for slaughter survey. The carcass composition at slaughter was determined using the slaughter survey method for evaluation criteria as described by Doan et al. (2011). Some surveyed criteria included live weight (g), carcass weight (g), breast meat percentage (%), and thigh meat percentage (%), performed according to the method described by Doan et al. (2011). Breast meat was used to determine the percentage of water loss during storage and processing after 24 hours of slaughter, according to Doan et al. (2011). Meat quality was assessed according to the methods of Doan et al. (2011).

pH of meat

pH was determined by pH meter Testo 230 (Testo Co, German) at 15 minutes (pH15); 24 hours (pH24); after slaughter with 3 replicates. The pH15 was measured at 15 minutes after slaughter by taking 10g of minced loin muscle into a 400 ml beaker, adding 100 ml of distilled water, homogenizing the sample and centrifuging at 7000 rpm, and measuring the pH of the solution as quickly as possible. Similarly, values of pH24 were measured on meat samples stored at 4^0C.

Drip loss

Meat samples were cut from the loin muscle with a size of thickness of 2.5 cm, width 2 cm and length 5 cm. They were weighed, put in a storage bag, sealed and stored at 2 – 4 ^{0}C according to Brondum et al. (2000). At 12, 24 and 48 hours after preservation, the sample should be taken immediately from the storage bag, lightly patted dry and weighed according to Brondum et al. (2000) and Honikel (1998). Drip loss was calculated formula;

Drip loss (%) = (P1-P2) x 100/P1

In which: P1 (g): initial weight; P2 (g): final weight.

Cooking loss

Meat samples were cut from the loin muscle with size of thickness of 2.5 cm, width 2 cm and length 5 cm, immediately weighed (initial weight), put in a polyethylene bag, heated in a water bath at 75^0C for 60 minutes, taken and weighed again (final weight). Cooking loss was calculated as following:

Cooking loss (%) = (P1−P2)*100/P1

In which: P1(g): initial weight; P2(g): final weight

Meat color

Meat color was measured in the loin sample with a Minolta CR-410 colorimeter (Japan) followed to Honikel (1998) and Baublits et al. (2006). The color was expressed as L*, a* and b* readings according to standard luminance D and standard angle of view 65° (Honikel, 1998; Baublits et al., 2006). - L* = 0 (black), L* = 100 white light (white light similar to BaSO4 or MgO burnt) - b* = - 60 (green), +60 (yellow) - a* = - 60 (blue), + 60 (red)

Data analysis

Data processing: Statistical data were processed using Minitab 16 software. Data on growth, yield, and meat quality were analyzed using one-factor ANOVA (analysis of variance based on sex). Statistical parameters included mean and standard deviation (SD). The Tukey test was used to compare mean values at a significance level of $P < 0.05$.

RESULT

Survival rate

The survival rates presented in Table 1 show that Mnu Buon chickens have a high survival rate, reaching 91.5% from 1 to 24 weeks of age. The survival rate from 0 to 2 weeks of age was 100%, at 4-8 weeks of age was 97%, and at 91.5-96% in the remaining weeks.

Growth of Mnu Buon chickens

Table 2 shows that the weight of chickens at 1 day old was 23.1g/chicken, at 6 weeks old was 217.8g/chicken, with a coefficient of variation (Cv%) ranging from 3.3–10.6%. At 24 weeks old, the weight of males reached 1572.8g/chicken, and females reached 1233.8g/chicken. The difference in weight between males and females was statistically significant ($P<0.05$) (Table 2 and Figure 1).

The absolute growth of Mnu Buon chickens is presented in Table 3 and Figure 2, showing that Mnu Buon chickens had an absolute growth rate from 1 day old to 24 weeks old of 9.2g/chicken/day for males and 7.2g/chicken/day for females, with statistically significant differences ($P<0.05$). The highest absolute growth was reached at 14-16 weeks old in males at 15.3g/chicken/day and in females at 16-18 weeks old at 11.3g/chicken/day.

Feed intake and feed consumption of Mnu Buon chickens

Feed intake of Mnu Buon chickens gradually increased with age and weight gain. From 1 to 24 weeks of age, male chickens consumed 45.4g/chicken/day, while female chickens consumed 39.7g/chicken/day. The difference in feed intake was statistically significant ($P<0.05$). Feed consumption per kg of weight gain was 4.9 kg feed/kg weight gain for male chickens and 5.4 kg feed/kg weight gain for female chickens.

Carcass yield of Mnu Buon chickens

The carcass yield of Mnu Buon chickens is presented in Table 5, showing that the chickens had a slaughter weight of 1220g (1020-1420g). The carcass weight was 1035g (870-1200g), the total carcass weight was 875g (720-1030g), the thigh weight was 200.5g (169.4-231.7g), and the breast weight was 163.1g (153.9-172.3g). Productivity indicators in roosters were higher than in hens (Table 5), with statistically significant differences ($P<0.05$). The percentage of carcass, carcass percentage, thigh meat percentage, breast meat percentage, and thigh-breast meat percentage in the rooster group were 84.7%, 72.6%, 22.5%, 16.7%, and 39.3%, respectively, while in the hen group they were 85.4%, 70.6%, 23.5%, 21.3%, and 44.8%. The breast meat percentage and thigh-breast meat percentage were higher in hens than in roosters with $P<0.05$.

The meat quality of Mnu Buon chicken

The pH_{15} values in thigh and breast meat were 6.33 and 6.31, respectively. After 24 hours, the pH_{24} values of the meat decreased to 5.81 and 5.78 (Table 6). There was no significant difference in the pH values of rooster and hen meat ($P>0.05$).

The color of Mnu Buon chicken meat

The color of the thigh meat (Table 6) shows that the L* values in rooster and hen meat were 54.6 and 54.9, respectively, the a* values were 12.46 and 10.8, and the b* values were 12.5 and 14.7, respectively, with no statistically significant difference ($P>0.05$). Similarly, for breast meat, the L* values were 59.6 and 59.9, the a* values were 11.75 and 10.78, and the b* values were 12.7 and 12.9. The color indicators for breast meat showed no significant difference ($P>0.05$).

Table 1 - Survival rates of Mnu Buon chickens across different age groups (%)

Age (Week)	Beginning of the week (chicken)	Weekend (chicken)	Weekly survival rate (%)	Overall survival rate (%)
1	200	200	100.0	100.0
2	200	200	100.0	100.0
3	200	195	97.5	97,5
4	195	194	99.5	97
5	194	194	100.0	97
6	194	194	100.0	97
7	194	194	100.0	97
8	194	194	100.0	97
9	194	193	99.5	96.5
10	194	193	99.5	96.5
11	194	193	99.5	96.5
12	194	192	99.0	96
13	192	192	100.0	96
14	192	192	100.0	96
15	192	187	97.4	93.5
16	187	187	100.0	93.5
17	187	187	100.0	93.5
18	187	187	100.0	93.5
19	187	185	98.9	92.5
29	185	185	100.0	92.5
21	185	185	100.0	92.5
22	185	183	98.9	91.5
23	183	183	100.0	91.5
24	183	183	100.0	91.5
Survival rate up to 24 weeks of age				91.5

Table 2 - Cumulative weight of Mnụ Buon chickens (g)

Weeks old	Total weight (Roosters + Hens)			
	Mean±SD (g)		Cv (%)	
Newly hatched	23.1±1.4		5.9	
1	41.1±1.4		3.3	
2	62.2±2.9		4.7	
3	87.4±9.2		10.5	
4	120.4±8.7		7.26	
5	162.2±13.9		8.6	
6	217.8±23.2		10.6	
	Roosters		Hens	
	Mean±SD (g)	Cv (%)	Mean±SD (g)	Cv (%)
8	326.9^{a}±9.9	3.0	253.1^{b}±8.9	3.5
10	437.8^{a}±11,6	2.7	327.4^{b}±10.0	3.1
12	589.1^{a}±13.2	2.2	416.6^{b}±11.2	2.7
14	779.7^{a}±13.9	1.9	521.7^{b}±11.4	2.2
16	994.1^{a}±17.5	1.8	649.7^{b}±12.7	2.0
18	1177.2^{a}±20.8	1.7	808.5^{b}±15.5	1.9
20	1312.5^{a}±22.0	1.8	962.7^{b}±18.6	1.9
22	1443.7^{a}±26.3	2,1	1101.8^{b}±18.0	1.6
24	1572.8^{a}±32.7	1.8	1233.8^{b}±18.0	1.5

Note: $^{a, b}$ Values within the same row that have different letters differ significantly ($p<0.05$).

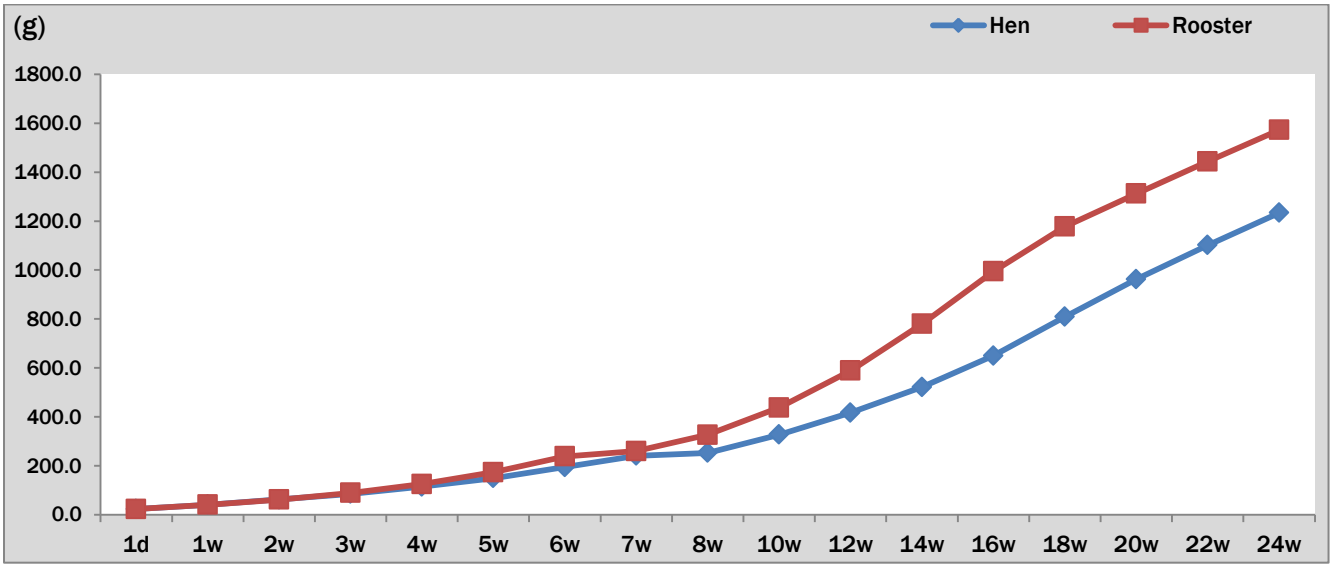

Figure 1 - Cumulative growth of Mnu Buon chickens from 1 day old to 24 weeks old.

Table 3 - Absolute weight gain of Mnu Buon chickens (g/day)

Weeks old	Increase in absolute weight (Roosters + Hens)			
	Mean±SD (g)		Cv (%)	
Newly hatched - 1	2.6±0.3		9.87	
1-2	30.0±0.5		15.5	
2-3	3.6±1.6		43.8	
3-4	4.7±1.2		26.15	
4-5	6.0±1.0		17.4	
5-6	7.0±1.5		19.4	
	Roosters		Hens	
	Mean±SD (g)	Cv (%)	Mean±SD (g)	Cv (%)
6-8	6.3^{a}±0.6	9.8	4.2^{b}±0.4	10.6
8-10	7.9^{a}±0.4	5.4	5.3^{b}±0.4	7.4
10-12	10.8^{a}±0.3	2.4	6.4^{b}±0.2	3.4
12-14	13.6^{a}±0,5	3.6	7.5^{b}±6.6	6.6
14-16	15.3^{a}±0.5	3.4	9.1^{b}±0.5	5.3
16-18	13.1^{a}±0.5	4.1	11.3^{b}±0.5	4.7
18-20	9.7^{a}±0.5	5.4	11.0^{b}±0.5	4.9
22-22	9.4^{b}±0.8	8.6	9.9^{a}±0.4	3.6
22-24	9.2^{b}±0.7	7.9	9.4^{a}±0.3	4.5
1 day old -24	9.2±0.2		7.2±0.1	

Note: $^{a, b}$ Values within the same row that have different letters differ significantly (P<0.05).

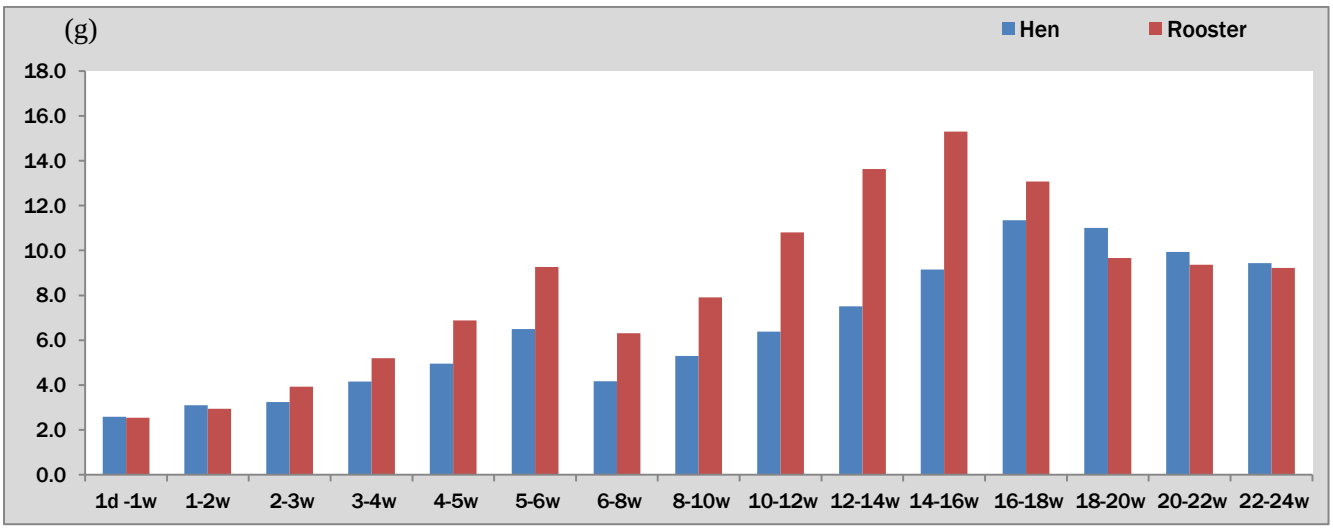

Figure 2 - Absolute growth of Mnu Buon chickens from 1 day old to 24 weeks old.

Table 4 - Feed intake from 0 to 24 weeks of age (g/chicken/day)

Weeks old	Mean±SD (n=150)		
1	2.7±0.2		
2	4.5±0.1		
3	6.3±0.5		
4	7.0±0.6		
5	8.7±0.7		
6	12.5±0.9		
	Roosters (n=79) Mean±SD	**Hens (n=71)** Mean±SD	**P**= Value
7	16.2^{a}±1.1	14.9^{b}±1.5	<0.001
8	20.8^{a}±0,9	18.0^{b}±0.8	<0.001
9	25.7^{a}±0.9	20.6^{b}±1.5	<0.001
10	29.8^{a}±0,8	24.4^{b}±1.9	<0.001
11	35.3^{a}±1.1	29.6^{b}±0.8	<0.001
12	38.2^{a}±0.4	31.1^{b}±1.3	<0.001
13	45.2^{a}±0.7	38.9^{b}±3.1	<0.001
14	48.4^{a}±1.3	42.6^{b}±1.7	<0.001
15	60.3^{a}±1.9	52.0^{b}±1.7	<0.001
16	66.2^{a}±0.9	54.9^{b}±1.3	<0.001
17	74.5^{a}±0.5	65.0^{b}±3.9	<0.001
18	78.3^{a}±0.9	65.7^{b}±2.3	<0.001
19	82.7^{a}±0.5	73.7^{b}±1.8	<0.001
20	83.3^{a}±2.1	74.3^{b}±2,5	<0.001
21	85.1^{a}±1.0	75.0^{b}±2.0	<0,001
22	85.6^{a}±1.1	75.7^{b}±2.1	<0.001
23	85.7^{a}±0.9	77.0^{b}±2.2	<0.001
24	86.4^{a}±1.0	78.0±2.1^{b}	<0.001
1-24	45.4±31.1	39.7±27.4	<0.076

Note: $^{a, b}$ Values within the same row that have different letters differ significantly (P<0.05).

Table 5 - Chicken carcass yield of local people in Dak Lak province.

Indicators	Total (n=10) Mean ± SD	Roosters (n=5) Mean ± SD	Hens (n=5) Mean ± SD
Live weight (g)	1220±74.2	1420^{a}±58.3	1020.0^{b}±37.4
Jaw hook weight (g)	1035±58.7	1200^{a}±35.4	870.0^{b}±25.50
Carcass weight (g)	875±57.5	1030^{a}±46.4	720.0^{b}±27.0
Thigh meat weight (g)	200.5±14.0	231.7^{a}±16.5	169.4^{a}±11.0
Breast weight (g)	163.1±6.3	172.3^{a}±5.6	153.9^{b}±10.1
Jaw hook ratio (%)	85.1±0.8	84.7±1.2	85.4±1.2
Carcass ratio (%)	71.6±0.9	72.6±1.6	70.6±0.4
Thigh meat ratio (%)	22.9±0.8	22.5±1.4	23.5±0.9
Breast meat ratio (%)	19.1±0.9	16.7^{b}±0.6	21.3^{a}±0.8
Ratio of thigh and breast meat (%)	42.1±1.3	39.3^{b}±1.4	44.8^{a}±1.2

Note: Values in the same row for male and female that have different letters are statistically significantly different (P<0.05).

Table 6 - Some quality indicators of chicken meat.

Type of meat	Indicator	Total (n=10)	Roosters (n=5)	Hens (n=5)
Thigh meat	pH_{15}	6.33±0.02	6.31±0.01	6.4±0.04
	pH_{24}	5.81±0.03	5.8±0.04	5.8±0.04
	L*	54.8±0.8	54.6±1.2	54.9±1.1
	a*	11.6±0.4	12.46±0.4	10.8±0.4
	b*	14.2±0.4	12.5±0.4	14.7±0.6
	Preservative water loss rate (%)	0.9^{b} ±0.2	0.7±0.1	1.1 ±0.3
	Processing water loss rate (%)	21.1±1,6	20.4±0.8	21.7±3.3
Breast meat	pH15	6.31±0.03	6.2±0.03	6.3±0.1
	pH24	5.78±0.02	5.8±0.04	5.8±0.1
	L*	59.8±0.8	59.6±1.2	59.9±1.1
	a*	11.2±0.4	11.8±0.6	10.8±0.4
	b*	13.7±0.6	12.7±0.9	12.9±0.9
	Preservative water loss rate (%)	1.5^{a} ±0.2	1.1±0.1	1.9±0.3
	Processing water loss rate (%)	18.9±0.6	19.8±0.8	17.9±0.6

Note: Values in the same column that have different letters are statistically significantly different (P<0.05).

DISCUSSION

Survival rate of Mnu Buon chickens

The survival rate of Mnu Buon chickens is high (Table 1). This is a long-domesticated breed that is highly adaptable to natural conditions and the care practices of ethnic minorities in Dak Lak province. These chickens can forage in nature and have high disease resistance, leading to a high survival rate. Compared to the results of Mui et al. (2012) on Long Cam chickens, which had an 80% survival rate from 0 to 15 weeks, Mnu Buon chickens show a higher rate. Thinh et al. (2016) stated that the survival rates for "Many-toed" chickens at 0-8 and 9-16 weeks were 90% and 88.3%, respectively. According to Thinh et al. (2020), Lac Thuy chickens reached 94.51% and 90.98% for the same periods. Dung et al. (2021) showed that Ri Dabaco chickens and golden-legged fighting rooster chickens have a high survival rate of 94-97%. Huong et al. (2023) noted a 95.83% survival rate for Van Linh chickens from 1 to 18 weeks. Our study shows that the survival rate of Mnu Buon chickens from 1 day to 24 weeks is 91.5%. This is quite high, similar to Dong Tao chickens and higher than Mia, Many-toed, and Lac Thuy chickens, but lowers than Van Linh chickens. These results prove that Mnu Buon chickens adapt well to the farming and natural conditions of Dak Lak.

Growth of Mnu Buon Chickens

The growth of Mnu Buon chickens increases with age from 1 to 24 weeks (Table 2), following the law of cumulative growth. At 1 day old, the weight is 23.1g per bird, which is lower than other breeds. For example, Van Linh chickens weigh 30.21g (Huong et al., 2023), and Ri Lac Son chickens weigh 25.28g (Thinh et al., 2020). At 24 weeks, the weight of roosters was 1305.5g and hens was 1104.8g). This weight is lower than Ri Lac Son, Van Linh, and Many-toed chickens. Mnu Buon chickens raised in Dak Lak are generally smaller than native breeds in other regions. The absolute growth rate was 9.2g/day for roosters and 7.2g/day for hens. The highest growth occurs at 14-16 weeks for roosters (15.3g/day) and 16-18 weeks for hens (11.3g/day). This result is lower than that of Ri Lac Son chickens at 20 years old, which was 14.1g/chicken/day in roosters and 10.7g/chicken/day in hens (Thinh et al. 2020); Huong et al. (2023) showed that Van Linh chickens at 18 weeks old had an absolute growth of 17.6g/chicken/day in roosters and 14.7g/chicken/day in hens. The results obtained in this study show that Mnu Buon chickens have a low body weight, only at the average level of native Vietnamese chicken breeds. This result is consistent with observations on breed that affect the growth performance of broiler chickens, indicating that breed has a significant influence on chicken body weight (Adebayo et al., 2023). The growth of Mnu Buon chickens is lower than that of other native chicken breeds raised domestically, possibly due to limitations in the selection and management of the breed. The decline in growth may be due to inbreeding and uncontrolled crossbreeding with many other breeds.

Feed intake and Carcass Yield

The feed intake of Mnu Buon chickens (Table 4) gradually increased with age, averaging 45.4 g for roosters and 39.7 g for hens throughout the rearing period. Feed intake of Mnu Buon chickens was lower than that of Ri Lạc Son chickens (50.2g/chicken/day; Thinh et al., 2020), Long Cam chickens (51.9 g/chicken/day; Mui et al., 2012), and Vạn Linh chickens (60.9 g/chicken/day) (Hương et al., 2023). The feed intake per kg of weight gain in Mnu Buon chickens was 4.9 kg in roosters and 5.4 kg in hens. This result was higher than that of Vạn Linh chickens from 1 to 18 feed intakes was 3.98 kg (Hương et al., 2023). Feed consumption of Mnu Buon chickens is lower than that of Mong chickens (Son et al., 2022). Feed intake increases with age, averaging 45.4g for roosters and 39.7g for hens. This is lower than Ri Lac Son, Long Cam, and Van Linh chickens. The carcass yield of Mnụ Buôn chickens (Table 5) shows that roosters have higher slaughter weight, carcass weight, thigh weight, breast weight, breast meat ratio, and thigh - breast meat ratio are higher than hens, with statistically significant differences ($P<0.05$). Mnu Buon chickens have lower meat yield than some Vietnamese native chicken breeds. Tham et al. (2016) showed that 24-week-old Dong Tao chickens have a slaughter weight of 2,716.55 g for roosters and 2,266.67g for hens. The carcass ration was 69.55% and 64.16%, the thigh meat yield was 23.24% and 23.57%, and the breast meat yield was 13.92% and 16.85%. Mui et al. (2012) reported that 15-week-old Long Cam chickens had a slaughter weight of 1,930.33g, carcass ration of 69.60%, thigh meat ratio of 22.25%, and breast meat ratio of 14.36% in males, and correspondingly in females of 1,430g, 68.4%, 22.34%, and 15.27%. Thinh et al. (2020) showed that 24-week-old Lac Thuy chickens had a carcass ratio of 81.29% in males and 75.48% in females; Carcass ratio in roosters and hens was 72.65% and 65.59%, respectively; thigh meat ratio was 23.71% in roosters and 20.19% in hens. Mnụ Buôn chickens have carcass yield, thigh meat yield, and breast meat yield comparable to Ri Dabaco chickens and yellow-legged fighting chickens (Dung et al., 2021). Slaughter weight, carcass yield, thigh meat yield, and breast meat yield in Mnụ Buon chickens are comparable to fighting chickens (Giang et al., 2023).

Meat quality

The results in Table 6 show that the meat quality indicators (sensory quality and processing quality) did not differ significantly between Mnụ Buon roosters and hens ($P>0.05$). A similar trend was also found in studies on chickens with the indicators of light color L*, red color a*, yellow color b*, storage and processing water loss percentage, pH15 and pH24 values (N'dri et al., 2007).

The L* value of Mnu Buon chicken breast meat is equivalent to that of Vạn Linh chicken (60.89), while the L* value of Mnu Buon chicken thigh meat (54.77) is higher than that of Vạn Linh chicken (52.64) (Huong et al., 2023). The L* values of Mnụ Buôn chicken breast and thigh meat are higher than those of Lac Thuy chicken breast and thigh meat (56.43; 46.96) (Thinh and Giang, 2020). The light color of Thai local chicken is 54.8 (Wattanachant et al., 2004). When comparing Vietnamese Mnu Buon chicken with Thai local chicken, the light color of Mnu Buon chicken in this experiment is higher. According to the classification of Qiao et al. (2002), Mnu Buon chicken meat belongs to the light-colored meat category (L* >53). Afrin et al. (2024) suggest that the values of brightness (L*), yellowness (b*), and yellowness (a*) are influenced by different chicken breeds, and rapid growth rate is also related to the yellowness value (b*). The meat color values in this study are consistent with studies on Ross, JA757, and ISA Dual chicken breeds, where the L*, b*, and a* values are significantly influenced by breed quality (Chodová et al., 2021). The rate of water loss during storage in thigh and breast meat was 0.89% and 1.52%, respectively ($P<0.05$); there was no difference between roosters and hens ($P>0.05$). Compared to other studies, Mnu Buon chicken meat had lower water loss than Lạc Thủy chicken (2.45% and 2.33%) (Thinh et al., 2020) and Ri Ninh Hoa chicken (2.85% and 2.48%). The processing water loss rate in thigh and breast meat was 21.07% and 18.87%, respectively ($P>0.05$). The processing water loss rate in breast meat of Mnu Buon chicken was comparable to that of Van Linh chicken (19.35%) (Huong et al., 2023). The storage and processing water loss rates of Mnu Buon chicken were within the limits of native chicken meat.

CONCLUSION

Mnu Buon chickens are a breed that adapts well to the farming methods of ethnic minorities in Dak Lak province. They have a high survival rate of 91.5%. Mnu Buon chickens belong to the low-weight group; at 24 weeks old, roosters weigh 1572.8g/chicken, and hens weigh 1233.8g/chicken. The feed consumption per kg of weight gain of Mnu Buon chickens at 24 weeks of age for roosters and hens was 4.9 and 5.4 kg, respectively. Mnu Buon chickens have lower meat yield than some Vietnamese native chicken breeds. The meat quality of Mnu Buon chickens is within the limits of Vietnamese native chicken breeds.

DECLARATION

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Authors' contributions
All authors had similar participation in designing, experiment, analysis and drafting the manuscript.

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All process of experiments was in according to animal welfare rules under monitoring of Tay Nguyen university ethical team.

Availability of data and material
The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

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Competing interests
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