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Biodiversity of chicken in Yangon Division, Union of Myanmar between November, 2015 and July, 2016

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Abstract

The biodiversity of chickens in Yangon Division, Union of Myanmar was analyzed in term of their population, production periods, production system, farming location, breeds, varieties of plumage colors, sustainable, and importance value index (IVI). The biodiversity form was used with 898 chickens in Yangon Division that covered north, east, west, and south sides: Hmawbi Town, New Town, HtanTapin Town, and Khawmu Town, respectively. The surveyed points were 5 villages with high chicken population in each town. The result showed that, Yangon Division, chickens were in every production period, chickens were fed in every area of the division, and Hmawbi Town had the biggest population. Most of the chickens were reared in traditional production system. From the sample of 73 adult chickens (29.92% of total adult chickens) was compared by chicken standard figure and standard books. The sample consisted of indigenous breeds as Myanmar native chicken (MNC) and Myanmar Fighting Cocks (MFC) and cross breeds as Layer+MFC crossbred and broiler. The MNC was most commonly found in Hmawbi Town and MFC in New Town. The varieties of plumage colors of chickens were 9 colors. Each town surveyed area had about 6-9 varieties of plumage colors. Chicken in the area was sustainable 50.68 %. The IVI of chickens was, by average, 75.00 out of 300 (25% in proportion). The MNC and MFC were of the highest importance in the area as the breeds aimed for breed development. In conclusion, Yangon Division is the area with high biodiversity of chickens in terms of population, production periods, breeds, varieties of plumage colors, and farming location. MNC and MFC are the most important breeds in this area.

Keywords: biodiversity, chicken, Yangon Division

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1. Introduction

Chickens have been used to human living for a long time. As the global population is rocketing, the consumption demand of meat and meat products grows accordingly. The increasing demand affects the number of animals and even their breeds. In addition, humans have also taken over the wildlife habitats, resulting in lower biodiversity. Yangon Division is in the south of the Union of Myanmar. It is an area with both urban and rural communities with abundant natural resources. Local people started to domesticate chickens and make use of them in daily life. People in this area have more chicken production-related activities than any other parts in Union of Myanmar. However, most chickens were kept by traditional/backyard small raising [1] and local chicken breeds were overwhelmingly popular in rural Myanmar [2] . Therefore, there are still a diversity of breeds, varieties of plumage colors, and indigenous breeds of stock. Pure breeds of chicken can be noticed by their origin, historical origins, original purpose, popularity, or size. In addition, varieties of chicken can be classified by their patterns of colors, plumage colors, tail colors and others characteristics [3]. Yangon Division is, therefore, the interesting place to study chicken biodiversity

The study on biodiversity of chicken in Yangon Division, Union of Myanmar, was a collaborative project between Thepsatri Rajabhat University, Thailand and University of Yangon, Union of Myanmar. The survey approach was used. Data were analyzed to determine chicken biodiversity in terms of population, production periods, type of farming/production system, breeds, varieties of plumage colors, farming location, sustainable, and importance value index. The data were expected to be able to use as the natural resource database for agriculture. They could be applied to develop the chicken breeds well-adapted to the environment, resistant to disease, and suitable to be organic meat chicken in the future. The potentially developed chicken breeds may be one way to increase economic value for chicken farming and other related activities in the system. It may widen the channel to access to chicken producers in the area as well as sustainable use of chicken.

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Table 1 Chicken biodiversity study area in Yangon Division

Items	Study area in Yangon Division			
	Hmawbi Town	**New Town**	**HtanTapin Town**	**Khawmu Town**
1	Hlapada village	16 Quarter	HtanTapin village	Zayat gone village
2	Naung gone village 1	17 Quarter	Kyaung Kone village	Hinthar gone village
3	Min village	135 Quarter	Sat kalay village	Apyauk village
4	Pattan village	153 Quarter	Alae Nyaung Pin	Nat sin gone village
5	Naung gone village 2	154 Quarter	3 Quarter	Makyi Kan village

2. Materials and methods

2.1 Data collection

The population chickens consisted of all chickens in Yangon Division. The sample group consisted of chickens in each town and each random survey point that were captured to record the data. There were 2 times surveyed and collected data in November, 2015 and July, 2016. The biodiversity form developed by applying Food and Agriculture Organization of The United Nations (FAO) [4] and research of Jupamatta *et al.* [5] was used as a research tool. Both of open-ended questions and close-ended questions were used in this survey. They survey form was developed and proposed to three experts for their review in term of content accuracy. The results were analyzed by Index of Item Objective Congruence: IOC. On the second analysis, the IOC value ranged from 0.73 to 1.00. The form was used in a trial study with 30 non-sample chickens to analyze for confidence. Cronbach's Alpha Coefficient was calculated and the result was 0.87. The finalized form was then printed out to collect the data.

The data recorded included breeds, varieties of colors, production periods, sex, number, and body weight. Location data included the name of town and name of survey point. To collect the data, researchers introduced themselves to the chicken owners in the areas. The introduction letter from University of Yangon was also sent to the owners. Data were gathered by asking chicken farmers at each surveyed point. Farmers were asked to gather in a small group. Biodiversity of adult chicken sample was also recorded in the form as well as by taking their photos to compare with the standard photo, books, and documents.

2.2 Study area

The research was carried in four towns of Yangon Division that covered north, east, west, and south sides: Hmawbi Town, New Town, HtanTapin Town, and Khawmu Town, respectively. A total of 20 villages selected at random from five villages with high chicken population in each town (Table 1). Each surveyed village was at least two kilo-meters away from one another. The surveyed points were 100 by 100 meters in area.

2.3 Comparing production system and standard figure

Type of chicken production system in each sur-veyed point was described by a threefold classification system based on Burgos *et al.*[1]. The data and photos of adult chicken sample was compared with American Poultry Association [3] that chickens characteristics were categorized by place of origin. Chickens were also divided by their historical origins, original purpose, popularity, or size according to British Poultry Standard [6]. In addition, the characteristics of Myanmar fighting cocks were sorted according to Best of Myanmar Good Chicken [7].

2.4 Data calculation and statistical analysis

The determination of the most important chicken breed from number of chicken, total body weight, and found area number was defined with important value index of chicken breed (IVI). The IVI was calculated by applying the important value index of Kut-in [8]. Biodiversity value was also calculated. Statistics used included per-centtage (%), mean ($\bar{x}$) and standard deviation (SD). Sustainable of chicken was compared by using a Paired-sample T test. Significance of differences in mean values among chicken numbers was reported with p-values of the T test. Means were separated with levels of significant set at $p<0.05$. Data were analyzed with SPSS [9].

3. Results and discussion

3.1 Chicken population, production periods, and production system in Yangon Division

The total populations of chicken in the surveyed areas were 868 heads (h). The average number of bird per surveyed point was 43.40±34.16 h. Production periods sorted by number of the most common to the least: baby chick, puberty and hen, young chick, growing and rooster, were 189.00, 165.00, and 165.00, 139.00, 131.00, and 79.00 h, respectively. The ratio of chicks (baby and young): growers (grower and puberty): adults (rooster and hen) were range from 1.3:1.2:1 and ratio of adult males to females was 1:2. These disagree with Pym *et al.* [10] reported many data of developing countries of Africa and Asia indicated the ratio of chicks: growers: adults were in range 1:1:2 to 3:2:2 and the ratio of adult

Table 2 Numbers and production period of chicken in study area of Yangon Division

Production periods	Study area (Town)				Total (h)
	Hmawbi Town	New Town	HtanTapin Town	Khawmu Town	
Baby chick, 0-6 wk of age (h)	71	49	50	19	189
Young chick, 7-12 wk of age (h)	68	25	40	6	139
Growing, 13-16 wk of age (h)	42	10	54	25	131
Puberty, 17-24 wk of age (h)	81	33	25	26	165
Rooster (h)	19	29	22	9	79
Hen (h)	63	33	56	13	165
Sum (h)	344	179	247	98	868

Remark: wk = week, h = head

Native chicken farming Fighting cock farming

Figure 1 Traditional/backyard chicken production in Yangon

males to females for was typically about 1:3. The highest chicken population area was Hmawbi Town to the north of Yangon Division (Table 2). Chickens were kept by traditional/backyard small raising chicken production (less than 50 h) accounting for 65% of farmers and most of which kept native chickens and fighting cocks as shown in Figure 1. The other 35% of chickens were reared in small- to medium-scale (a flock size ranging from 50 to 1,000 h). These agree with Burgos *et al*. [1] and [2] suggested that most of chicken farmers in Union of Myanmar were based on the smallholding backyard systems. However, the proportions of chicken in tradetional chicken production and small-to medium-scale are not similar to Burgos *et al*. [1] who reported that were 84% and 16%, respectively. In this study, such a high volume as intensive poultry production (having more than 1,000 h) was not found.

3.2 Chicken breeds diversity in Yangon Division

Regarding the breeds of chicken, by focusing on 73 adult chickens sample or 29.92% of all adult chickens (No. of hen + No. of rooster), there were found indigenous breeds and cross breeds. The indigenous breeds had two groups: 1) Myanmar native chicken (MNC), this village chicken group is raised for meat production. The body weight of adult males and females were 1.65±0.61 kg and 1.49±0.63 kg, respectively, MNC as shown in Figure 2. Those quality traits agree with village chickens name Hle Pyaung, Taik Kyet, Tainnyin and Sittagaung [2]. 2) Myanmar Fighting Cock (MFC), this group is fed, trained for fighting. The body weight of adult males and females were 1.94±0.36 kg and 1.23±0.47 kg, respectively, MFC as shown in Figure 3. The MFC phenotypically characterized based on morphology, shape, plumage colors, comb types are similar to MFC in Gamecocks Magazine Company Limited [7] presented specific morphology of MFC in Mandalay division (Mandalay, Kyauk padaung, Negee, Mah laing, Nyaun goo), in Magway division (Pakokku, Yenanchaung) and in Shan state (Nammout or Kengtung) Union of Myanmar. And MFC are also similar in Lop Buri Province of Thailand reported by Jupamatta and Saekwao [11]. However, body weights of adult males and females MFC in Thailand were 2.77±0.16 kg and 1.83±0.1 kg, respectively. This research was found 47.95% of both groups, account for 95.89% of adult chickens sample. There were 2 cross breeds: 1) Layer+ MFC crossbred and 2) broiler found 2.74 % and 1.37%, respectively. This broiler characteristic shape and plumage colors are similar to commercial boiler [12]. The details of chicken groups in each town/location are shown in Table 3. The research indicated that there were only a few breeds of

Table 3 Diversity of chicken numbers, breed/group and plumage color in Yangon Division

Breeds/ groups	Plumage colors	Study area (Town)				Total	
		Hmawbi Town	New Town	HtanTapin Town	Khawmu Town	(h)	(%)
Myanmar native chicken (MNC)	white	2	-	-	-	2	2.74
	gray	4	-	3	-	7	9.59
	barred	1	1	-	-	2	2.74
	be spot	1	-	-	-	1	1.37
	yellow	1	-	-	-	1	1.37
	crimson	-	2	-	1	3	4.11
	silver	1	-	1	4	6	8.22
	black	3	-	-	-	3	4.11
	brown	4	2	2	2	10	13.70
	sum	17	5	6	7	35	47.95
Myanmar fighting cocks (MFC)	white	-	1	-	-	1	1.37
	gray	-	3	-	-	3	4.11
	crimson	-	8	3	4	15	20.55
	silver	-	4	6	1	11	15.07
	black	-	4	-	-	4	5.48
	brown	-	1	-	-	1	1.37
	sum	-	21	9	5	35	47.95
Layer+MFC crossbred	brown	-	-	2	-	2	2.74
	sum	-	-	2	-	2	2.74
Broiler	white	-	-	-	1	1	1.37
	sum	-	-	-	1	1	1.37
Sum (h)		17	26	17	13	73	100.00
%h		23.29	35.62	23.29	17.81	100.00	
	No. colors	8	9	6	6		

Remark: h= head, %h = % of adult chickens sample, - = data no found

Barred color Gray color Brown color

Figure 2 Myanmar native chicken and varieties of plumage colors

chicken in Yangon Division. In addition, the proportion of indigenous breeds was different from Jupamatta *et al.* [5] who reported Lao native chicken was main group (77.12% fed by local people in Champasak Province, Lao People's Democratic Republic (Lao PDR.)). The chicken was also different from Jupamatta and Saekwao [11] that reported 90% of fighting cocks fed in Lop Buri Province, Thailand.

3.3 Varieties of plumage colors of each chicken breed in Yangon Division

The varieties of chicken consisted 9 plumage colors which covered all plumage color of chickens in the

Crimson color Silver color Gray color

Figure 3 Myanmar fighting cock and varieties of plumage colors

surveyed area (Table 3). Those were less varied than chicken in Lao PDR. and Thailand. Jupamatta *et al*. [5] reported chickens fed in Champasak Province, Lao PDR. had 11 plumage colors. In addition, Jupamatta and Saekwao [11] reported that fighting cocks in Lop Buri Province, Thailand were also 11 plumage colors. The 9 plumage colors of chickens were found crimson, silver, brown, gray, black, white, barred, be spotted, and yellow, and the proportion of each color was 24.66%, 23.29%, 17.81%, 13.70%, 9.59%, 5.48%, 2.74%, 1.37%, and 1.37%, respectively. It was also found 17 sub- plumage colors which were 9 of MNC, 6 of MFC while Layer+ MFC crossbred and broilers only had one color each. The varieties of plumage colors of some MNC and MFC as shown in Figure 2 and Figure 3, respectively.

When sorting the plumage colors of chicken by breeds, location, and percentage of adult chicken sample (Table 3), it was found that, 1) 50% of white chickens (2 h) were found in MNC, and the rest in MFC and broiler at the proportion of 25% each. 2) Gray plumage color chickens were found in MNC and MFC at 70% and 30%, respectively. 3) Barred, be spotted and yellow chickens plumage colors were only found in MNC breed. 4) Most crimson plumage color chickens were found in MFC (83.33%) while the remaining 16.67% was found in MNC. 5) Silver plumage color chickens were mostly found in MNC breed. 6) Black plumage color chickens were found in MNC and MFC breeds at 42.85% and 57.14%, respectively. And 7) brown plumage color chickens were found in MNC, MFC, and Layer + MFC cross breeds at the proportion of 76.92%, 7.69%, and 15.38%, respectively.

3.4 Farming locations of each chicken breed in Yangon Division

By sorting out the breed of chickens fed in different locations, MNC chickens were fed in the four town of Yangon Division surveyed, but most commonly found in Hmawbi Town (23.29% of adult chickens sample). This result indicating that the breed was spread to every town and popular in Yangon Division. This agrees with Jupamatta *et al*. [5] who reported Lao native chicken was fed in every town in Champasak Province, Lao PDR. The MFC chickens were commonly found in the east, west, and south side of Yangon Division, but mostly found in the east, namely New Town (28.77% of adult chickens sample). The data indicating that if one wants to find MFC chickens, it is advisable to come to New Town. This study also suggested that in some areas MFC chickens were raised in the same way as Lao people in Champasak Province did, where the breed was most concentrated in the town with cockpit arena [5]. However, the results were not similar to Jupamatta and Saekwao [11] reported fighting cocks were scattered in every district of Lopburi Province, Thailand. The Layer+ MFC crossbred were found only in the west, namely HtanTapin Town. Broiler was found in Khawmu Town south of Yangon Division (Table 3). This agrees with Henning *et al*. [12] who reported one farm near Yangon fed CP broilers. The broilers were kept on bamboo grids, which were placed on stakes. Broilers were fed with CP feed (Myanmar C.P. Livestock Co. Ltd, Yangon, Myanmar). It could be said that Layer+MFC crossbreds and broiler were not fed in many areas of Yangon Division.

3.5 Diversity of farming location of each breed and plumage colors

Each town surveyed had the plumage colors of about 6-9, approximately the same numbers of plumage colors of chicken in Lop Buri Province, Thailand where there were 4-9 colors [11]. HtanTapin Town was the highest number of plumage colors, followed by Hmawbi Town, New Town, and Khawmu Town (Table 3). The diversity of locations of each breed and plumage color was explained as follows. 1) More than 50% of MNC breeds with white, gray, barred, be spotted, yellow, and black were found in Hmawbi Town. Crimson color chickens were found in New Town and Khawmu Town. About 66.67% of silver plumage color chickens were found in Khawmu Town and the rest in Hmawbi Town and HtanTapin Town. Of the plumage brown chicken, 40.00% were found in Hmawbi Town and the rest in other towns. 2) MFC chickens with plumage white, gray, black, and brown color were found in New Town. The plumage crimson color chickens were found in 3 towns: New Town (53.33%), and the rest in HtanTapin Town, and Khawmu Town. Silver color chickens were found in HtanTapin Town and New Town at the proportion of

Table 4 Sustainable of chicken in Yangon Division

Items	Sustainable (%)	Chicken number (h)		P-value
		First time	Second time	
		$\bar{x}$ ±SD	$\bar{x}$ ±SD	
Study area				
Hmawbi Town (n=5)	94.12	3.40±2.70	3.20±2.77	0.37
New Town (n=5)	3.85	5.20±5.07	3.20±2.77	0.09
HtanTapin Town (n=5)	64.71	3.40±1.14	2.20±1.30	0.07
Khawmu Town (n=5)	69.23	2.60±1.95	1.80±1.48	0.18
Sum (n=20)	50.68	3.00^{a}±0.67	1.93^{b}±0.43	0.02
Indigenous breed/cross breed				
Myanmar native chicken (MNC)	74.29	8.75±5.56	6.50±6.56	0.06
Myanmar fighting cocks (MFC)	28.57	8.75±8.96	2.50±2.89	0.30
Layer+MFC crossbred	50.00	0.50±1.00	0.25±0.50	0.39
Broiler	0.00	0.25±0.50	0.00±0.00	0.39

Remark: n = Number of survey point, $\bar{x}$ = Mean, SD = Stand derivation, p value = Significance of the T test of the Paired-sample T test, [ab] Means in the same row with different superscripts are different ($p<0.05$).

54.54% and 36.36% respectively, and the rest in Khawmu Town. 3) Layer+MFC crossbred were found to have only brown plumage color and found only in HtanTapin Town. 4) Broiler was only found to have white feathers. The only town where locals bought broilers from the market to keep was Khawmu Town.

3.6 Sustainable of chicken in Yangon Division

When focusing the number of chicken in 73 adult chickens sample. The average number of chickens in each point surveyed in second time was 1.93±0.43 h lower than 3.00±0.67 h of first time (p=0.02, Table 4). This indicated that chicken in Yangon Division was sustainable 50.68 %. This disagrees with Jupamatta *et al*. [5] who reported chicken fed in Champasak Province, Lao PDR was survival 33.89%. In addition, there was lower than 98.70% of fighting cock in Lop Buri Province, Thailand [11].

When comparing study area, Hmawbi Town had the highest livable of chicken (94.12%) compared with the other town. However, there were no difference in average number of chickens found in first time and second time of each town ($p>0.05$, Table 4). When comparing chicken breed, The MNC breed was sustainable 74.29% more than Layer+MFC crossbred, MFC and Broiler that were 50.00, 28.57, and 0.00 %, respectively. Nevertheless, number of MNC in second time surveyed trend to lower than first time (p=0.06). Causes of the poultry unsustainable in Yangon Division, MNC chicken was raised for home consumption as well as for sale in the village. These agree with Henning *et al.* [12] reported chicken meat was only consumed once a month within a family or on special occasions such as visits by guests. The MFC was raised mainly for sport and sale. Owners of fighting cocks indicated that more profit was made by feeding fighting cocks than by raising village chickens for the sale of meat. The prices of MFC in the division are similar to those of Henning *et al*. [12] reported trained fighting cocks were sold for 3,000–5,000 Kyat. Well trained fighting cocks can be sold for 30,000–50,000 Kyat. In addition, MFC had affected by Newcastle disease, especially in the area of New Town.

3.7 Importance of chicken breeds in Yangon Division

According to the analysis of importance value index (IVI) of chicken breeds in Table 5 from 73 adult chicken samples, there were 2 indigenous breeds and 2 cross breeds. The average number of each breed/cross breed was 18.25±19.35 h. The average body weight of each breed/cross breed was 30.40±31.56 kg. MFC breed had the net body weight of 61.39 kg, more than other breeds/cross breeds. The result showed that, the standard deviation (SD) of number and body weight of the chicken was a little more than the averages, indicating that the number and body weight of each breed/cross breed were different throughout Yangon Division. Density of chicken breed (D) in Yangon Division had the average of 91.25 h/0.20 km^2 of area. MFC and MNC breeds had the highest and same D values (D=175). Frequency of chicken breed (F) indicates how frequent a certain chicken breed found in the surveyed area. From all surveyed areas, it was found that the average F was 0.29, which was not regarded as very frequent. However, MNC breed had the average F of 0.60, which was considered quite common. Dominance of chicken breed (Do) refers to the dominance value of net body weight of a certain chicken breed. It was found

Table 5 Important value index of chicken breed/group in Yangon Division

Items	Indigenous breeds		Cross breed		Total	$\bar{x}$ ±SD
	MNC	MFC	Layer+MFC	Broiler		
No.(h)	35.00	35.00	2.00	1.00	73.00	18.25±19.35
Total BW (kg)	53.80	61.39	3.20	3.20	121.59	30.40±31.56
D	175.00	175.00	10.00	5.00	365.00	91.25±24.18
F	0.60	0.45	0.05	0.05	1.15	0.29±0.28
Do	269.00	306.95	16.00	16.00	607.95	151.99±157.79
RD	47.95	47.95	2.74	1.37	100.00	25.00±26.50
RF	52.17	39.13	4.35	4.35	100.00	25.00±24.43
RDo	44.25	50.49	2.63	2.63	100.00	25.00±25.95
IVI (300)	144.37	137.56	9.72	8.35	300.00	75.00±76.22
IVI (100%)	48.12	45.85	3.24	2.78	100.00	25.00±25.41

Remark: MNC = Myanmar native chicken, MFC = Myanmar fighting cock, $\bar{x}$ = Mean, SD = Stand derivation, D = density of chicken breed, F= frequency of chicken breed, Do = Dominance of chicken breed, RD = Relative density of chicken breed, RF = Relative frequency of chicken breed, RDo = Relative dominance of chicken breed and IVI = Important value index of chicken breed

that Do value of chickens in Yangon Division was 151.99 kg/0.20 km^2 (759.94 kg/km^2). MFC had the highest Do value at 306.95 kg /0.20 km^2 (1534.75kg/km^2). Relative density of chicken breed (RD) is the density percentage of the chicken population in each breed of all chicken. Yangon Division had the average RD value of 25% and MNC and MFC had the same RD at 47.95% which was considered high. Relative frequency of chicken breed (RF) was used to compare the frequency of a certain chicken breed to the overall chicken breed surveyed. It was found that Yangon Division had the average RF of 25.00% which was considered high. MNC had the highest RF value of 52.17%. Relative dominance of chicken breed (RDo) is the dominance percentage of net body weight of a certain chicken breed compared to the dominance value of all chicken breeds surveyed. It was found that RDo of chickens in Yangon Division had the average RDo of 25% and MFC had the highest value of 50.49%. The RD, RDF, and RDo values of chickens in Yangon Division were higher than those in Lopburi Province which had only 8.33% [11].

The importance value index (IVI) of chicken breeds (Table 5) based on Kut-in equation [8] had the overall units of 300. According to the survey in Yangon Division, the average was 75.00 out of 300 (or 25% by proportion). The IVI value of Yangon Division was higher than that in Champasak Province, Lao PDR. (14.29%) [5] and in Lopburi Province, Thailand (8.33%) [11]. The data suggested that IVI of MNC, the most important breed in this area was 144.37 (48.12%), MFC, the second most important breed was 137.56 (45.85%), merely 2.27% shorter. These results indicated that Yangon Division did not only had MNC breed as the major chickens, MFC breed also gained popularity among the people as the breeds to be developed. On the other hand, Layer +MFC crossbred and broiler had lower IVI values. Therefore, they had the tendency to become extinct because the roosters of these latter breeds were found to be fewer than five birds and none of which was pure breed [13]. In other words, these chickens might be the newly introduced breeds, which may not be so popular among the farmers in Yangon Division.

4. Conclusions

1) The total population of chicken in the surveyed areas (4 towns, 5 villages each) at Yangon Division was 868 heads, which were in the production periods of baby chick, young chicken, growing chicken, puberty, rooster, and hen. Hmawbi Town in the northern side of Yangon Division had the biggest chicken population. Most of the chickens were fed by traditional production system.

2) Chickens in Yangon Division consisted of 2 groups of indigenous breeds: Myanmar native chicken and Myanmar fighting cocks; and 2 cross breeds: Layer+MFC crossbred and broiler. Myanmar native chickens were most commonly found in Hmawbi Town, Myanmar fighting cocks in New Town, Layer+MFC crossbreds were only found in HtanTapin Town, and broiler only in Khawmu Town.

3) The plumage colors of chickens were found to have the varieties of 9, sorted descending as crimson, silver, brown, gray, black, barred, white, be spotted, and yellow. Each town surveyed had the range of 6-9 plumage colors. The town with the higher number of plumage colors was HtanTapin Town, followed by Hmawbi Town, New Town, and Khawmu Town, respectively.

4) Chicken in the area was sustainable 50.68 % and importance value index (IVI) of chicken breeds in Yangon Division had the average of 75.00 out of 300 (25% in proportion). Myanmar native chicken and Myanmar fighting cocks were the most important breeds in this area while Layer+MFC crossbred and broiler had low IVI.

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