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Research Article

GROSS MORPHOLOGICAL AND BIOMETRICAL STUDIES ON THE THYMUS IN VARIOUS CHICKEN GENOTYPES

N. DAHARIYA, S. SATHAPATHY*, U.K. MISHRA, R. PATRA, S. DEHURY, S.K. JOSHI[1], S.K. SAHU and BISWADEEP JENA[2]

Department of Veterinary Anatomy and Histology, [2]Department of Veterinary Surgery and Radiology, CVSc. and A.H., [1]KVK, Jharsuguda, OUAT, Bhubaneswar - 751 003, India

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ABSTRACT

In the present study, a total number of eighteen-day old Hansli chicks and eighteen-day old Vencobb broiler chicks were divided into three age groups *viz.* group I (up to 1 month), group II (1-3 months) and group III (3-6 months) with six birds in each age group. On each observation day (4th week, 12th week and 24th week), six birds from each breed were used for the study of gross morphological and gross morphometrical features of the thymus. Each thymus comprised of six lobes arranged in long chains situated on either side of the neck in both Hansli chicken and Vencobb broiler chicken. The average weight of the right thymus was found to be 0.27±0.02 gm and 5.4±0.08 gm in Hansli chicken at 4th and 12th week of age, respectively and were significantly ($p \leq 0.05$) less than the average weight of right thymus in Vencobb broiler chicken at these ages, where they were measured as 0.42 ± 0.02 gm and 6.4 ± 0.12 gm, respectively. Further, the average size and weight of the organ increased up to 12th week of age and then gradually decreased in the 24th week of age in both the birds. The present study provided a detailed baseline data on the age-wise development of thymus in Hansli chicken and Vencobb broiler chicken which could be used in future research in other breeds of birds.

Keywords: Biometry, Hansli, Morphology, Thymus

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The organized poultry sector contributes about 70 per cent of the total output of poultry industry and the remaining 30 per cent is shared by the unorganized sector (Ali, 2015). The indigenous breeds of chickens mostly contribute to the rural economies in most of the underdeveloped and developing countries like India (Dahariya *et al.*, 2020a ; Dahariya *et al.*, 2020b).

Several studies have been reported on the lymphoid system of broiler chicken (Khan *et al.*, 2014), domestic chicken (Kannan *et al.*, 2015), Japanese quail (Senapati *et al.*, 2015) and turkey (Ali, 2016), but very scarce literature is available on the lymphoid system of Hansli chicken and Vencobb broiler chicken till date. Viewing the increased popularity of the Hansli chicken and Vencobb broiler chicken in Odisha, the present study is carried out on the gross morphological and morphometrical development of thymus in these breeds with age.

MATERIALS AND METHODS

A total number of eighteen-day old Hansli chicks and eighteen-day old Vencobb broiler chicks were purchased from Mayurbhanj district and Eastern Hatcheries Pvt. Ltd., Bhubaneswar, Odisha (A subsidiary of Venkateswara Hatcheries Group, Pune), respectively to study the post-hatched development of major lymphoid organs such as thymus. The birds (Hansli chicken and Vencobb broiler chicken) were divided into three age groups *viz*. group I (up to 1 month), group II (1-3 months) and group III (3-6 months) with six birds in each age group. On each observation day (4th week, 12th week and 24th week), six birds from each breed were used for the study of gross morphological and gross morphometrical features of the thymus. The different biometrical parameters of the organ were recorded with the help of weighing machine, graduated tape, scale and digital Vernier's calipar (DUC 150 mm Digital Caliper). The recorded data were subjected to routine statistical analysis as per the standard methods given by Snedecor and Cochran (1994) and independent samples t-Test with Systat Software Inc, USA and SPSS 16.0 version software.

*Corresponding: srinivas.ouat@gmail.com

RESULTS AND DISCUSSION

(i) Gross Morphology

The thymus was a paired organ situated on either of the neck. The left thymus was located deep and closer to the esophagus, trachea, blood vessels and nerves passing through the neck. However, the right thymus was situated superficially below the skin and quite away from the structures passing through the neck. Each thymus was comprised of 6 lobes in both Hansli chicken and Vencobb broiler chicken (Fig. 1, Fig. 2 & Fig. 3). The thymic lobes were embedded in the subdermal connective tissue. The lobes were irregular elliptical shaped and had smooth surfaces. The lobes had various colours such as pale white to yellowish white and pale pink in all the age groups under study. The present finding was in agreement with Kumar *et al.* (2001) in chicken, Muthukumaran *et al.* (2011) in

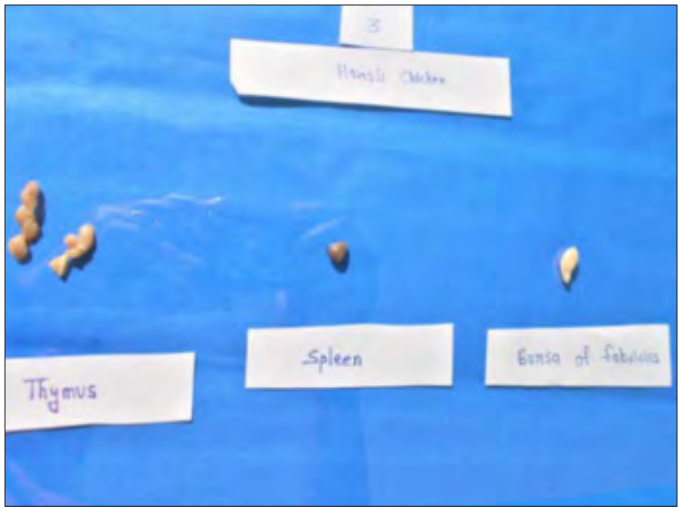

Fig. 1. Photograph showing left and right thymus, spleen ad bursa of Fabricius of Hansli chicken (4th week)

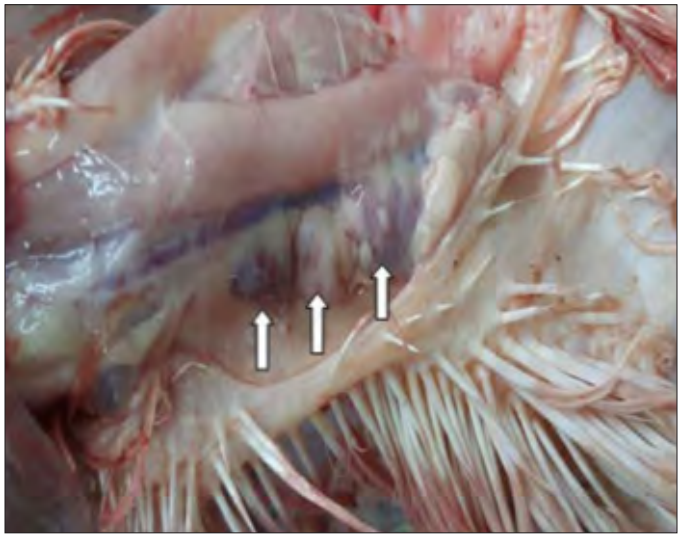

Fig. 3. Photograph showing lobes of right thymus (arrows) of Vencobb broiler chicken (12th week)

turkeys, Sultana *et al.* (2011) in ducklings, Lochi *et al.* (2014) in Aseel chicken and Mahanta (2018) in local hill fowl of Uttarakhand and RIR. The lobes had convex dorsal surface and flattened ventral surfaces in both the birds. The present findings were in line with Mahanta (2018) who found similar results in local hill fowl of Uttarakhand and RIR.

(ii) Biometrical observations

The average body weight of the Hansli chicken was found to be 205±6.06 gm, 1150±36.5 gm and 1773.3 ± 23.47 gm at 4th week, 12th week and 24th weeks of age, respectively. Similarly, the average body weight of the Vencobb broiler chicken was measured as 650 ± 10.29 gm, 1638 ± 39.47 gm and 2058.6 ± 21.69 gm at 4th week, 12th week and 24th weeks of age, respectively. Further, the difference in the average body weight was found to be significant ($p \leq 0.05$) in 12th week of age between the birds.

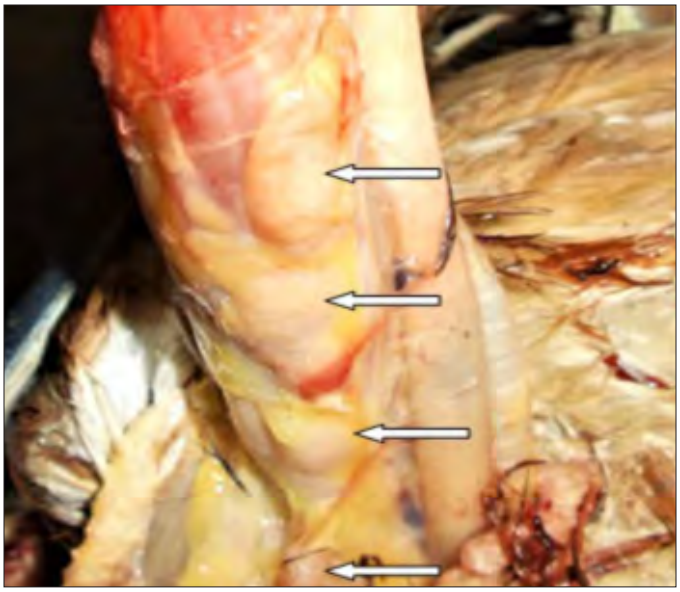

Fig. 2. Photograph showing lobes of left thymus (arrows) of Hansli chicken (12th week)

The average weight of the left thymus in Hansli chicken was found to be 0.18±0.03 gm, 4.6±0.12 gm, 0.9± 0.08 gm at 4th week, 12th week and 24th week of age, respectively. Similarly, the average weight of the left thymus in Vencobb broiler chicken was measured as 0.53 ± 0.06 gm, 5.3±0.06 gm and 1.4±0.11 gm, respectively. The average weight of the right thymus in Hansli chicken was found to be 0.27±0.02 gm, 5.4±0.08 gm and 1.1±0.08 gm, respectively. Similarly, average weight of the right thymus in Vencobb broiler chicken was measured as 0.42 ± 0.02 gm, 6.4 ± 0.12 gm and 1.3 ± 0.05 gm, respectively. Further, the difference in the average weight of the right thymus was found to be significant ($p \leq 0.05$) in 4th week and 12th week of age between the birds. Muthukumaran *et al.* (2011) found that the thymus attained its maximum weight at the age of 6 months in both the sexes of turkey and they weighed about 1.42 ± 0.07 gm on right side and 1.25 ± 0.02 gm on left side. Khenenou *et al.* (2012) observed that the accelerated growth of the thymus started from the first week of age and continued up to the second week (0.007 %) in broiler chicken. The second phase finished on the seventh weeks of age (0.0016 %). The involution of the organ started from the seventh week of age and it was completed by 23rd weeks of age.

(a) First lobe

The biometric observations are presented in table 1.

The difference in the average weight of the first lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the average length of the first lobe of the right thymus was

found to be significant ($p \leq 0.05$) in 24th week of age between the birds.

The difference in the average middle width of the first lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the average middle thickness of the first lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the average caudal thickness of the first lobe of the left thymus was found to be significant ($p \leq 0.05$) in 4th week of age between the birds.

(b) Second lobe

The biometric observations are presented in table 2.

The difference in the average weight of the second lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the average length of the second lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the average length of the second lobe of the right thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the average cranial width of the second lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week and 24th week of age between the birds. The difference in the average cranial width of the second lobe of the right thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds.

The difference in the average middle width of the second lobe of the left thymus was found to be significant ($p \leq 0.05$) in 24th week of age between the birds. The difference in the average middle width of the second lobe of the right thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the average middle width of the second lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds.

The difference in the average cranial width of the second lobe of the left thymus was found to be significant ($p \leq 0.05$) in 4th week of age between the birds The difference in the average cranial width of the second lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the average cranial thickness of the second lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds.

(c) Third lobe

The biometric observations are presented in table 3.

The difference in the average length of the third lobe of the right thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the

Table 1

Age wise various biometrical parameters of first lobe of thymus of Hansli chicken (HC) and Vencobb broiler chicken (VC)

Parameters		Left			Right		
		4 wks	12 wks	24 wks	4 wks	12 wks	24 wks
Weight (gm)	VC	0.28±0.04	0.9±0.04	0.12±0.02	0.36±0.03	0.50±0.09	0.14±0.03
	HC	0.23±0.005	0.67*±0.01	0.06±0.005	0.23±0.01	0.39±0.003	0.05±0.001
Length (mm)	VC	0.33±0.02	0.57±0.02	0.20±0.06	0.22±0.01	0.57±0.02	0.19±0.01
	HC	0.27±0.003	0.48±0.01	0.17±0.001	0.17±0.001	0.48±0.01	0.13*±0.001
Cranial width (mm)	VC	0.20±0.003	0.50±0.04	0.10±0.002	0.21±0.03	0.49±0.03	0.08±0.001
	HC	0.16±0.01	0.41±0.01	0.07±0.001	0.13±0.001	0.42±0.02	0.06±0.001
Middle width (mm)	VC	0.22±0.008	0.53±0.02	0.11±0.002	0.24±0.002	0.50±0.02	0.10±0.002
	HC	0.18±0.003	0.42*±0.007	0.08±0.003	0.15±0.004	0.44±0.01	0.08±0.001
Caudal width (mm)	VC	0.17±0.01	0.40±0.02	0.09±0.002	0.19±0.004	0.47±0.03	0.07±0.001
	HC	0.14±0.02	0.34±0.009	0.06±0.002	0.12±0.005	0.39±0.01	0.05±0.001
Cranial thickness (mm)	VC	0.21±0.01	0.33±0.01	0.11±0.001	0.20±0.002	0.31±0.007	0.10±0.001
	HC	0.14±0.008	0.27±0.004	0.09±0.001	0.13±0.001	0.25±0.01	0.08±0.002
Middle thickness (mm)	VC	0.24±0.001	0.56±0.02	0.12±0.003	0.24±0.004	0.55±0.03	0.14±0.01
	HC	0.16±0.006	0.29*±0.01	0.10±0.002	0.16±0.001	0.28±0.002	0.09±0.001
Caudal thickness (mm)	VC	0.19±0.002	0.30±0.02	0.10±0.003	0.18±0.01	0.29±0.004	0.09±0.002
	HC	0.12*±0.002	0.24±0.01	0.08±0.001	0.10±0.001	0.22±0.003	0.06±0.002

Values bearing superscript (*) differ significantly in row $p \leq 0.05$

Table 2

Age wise various biometrical parameters of second lobe of thymus of Hansli chicken (HC) and Vencobb broiler chicken (VC)

Parameters		Left			Right		
		4 wks	12 wks	24 wks	4 wks	12 wks	24 wks
Weight (gm)	VC	0.13±0.003	0.44±0.02	0.08±0.002	0.17±0.01	0.52±0.03	0.09±0.001
	HC	0.09±0.005	0.31±0.02	0.06±0.001	0.08±0.002	0.35*±0.02	0.07±0.001
Length (mm)	VC	0.19±0.02	0.53±0.02	0.11±0.005	0.20±0.008	0.54±0.01	0.08±0.003
	HC	0.16±0.006	0.33*±0.008	0.08±0.001	0.14±0.004	0.35*±0.02	0.08±0.002
Cranial width (mm)	VC	0.10±0.003	0.44±0.02	0.08±0.002	0.13±0.01	0.49±0.02	0.10 ±0.002
	HC	0.09±0.004	0.30*±0.02	0.04*±0.001	0.10±0.005	0.28*±0.02	0.09±0.001
Middle width (mm)	VC	0.19±0.006	0.56±0.04	0.14±0.004	0.21±0.002	0.54±0.03	0.13±0.01
	HC	0.14±0.007	0.37±0.02	0.06*±0.001	0.13±0.01	0.35*±0.01	0.10±0.002
Caudal width (mm)	VC	0.06±0.001	0.30±0.02	0.05±0.002	0.10±0.01	0.45±0.11	0.08±0.002
	HC	0.05±0.001	0.15*±0.01	0.03±0.001	0.07±0.01	0.15±0.009	0.04±0.001
Cranial thickness (mm)	VC	0.14±0.001	0.64±0.001	0.10±0.001	0.14±0.002	0.75±0.03	0.10±0.01
	HC	0.12*±0.005	0.56±0.02	0.08±0.006	0.11±0.003	0.54*±0.01	0.08±0.003
Middle thickness (mm)	VC	0.16±0.009	0.82±0.03	0.11±0.002	0.15±0.001	0.85±0.02	0.12±0.009
	HC	0.22±0.001	0.74*±0.01	0.10±0.001	0.13±0.002	0.74±0.04	0.10±0.002
Caudal thickness (mm)	VC	0.12±0.006	0.53±0.006	0.09±0.007	0.12±0.001	0.64±0.008	0.08±0.003
	HC	0.06±0.001	0.44±0.008	0.05±0.001	0.09±0.001	0.48±0.02	0.06±0.002

Values bearing superscript (*) differ significantly in row $p \leq 0.05$

Table 3

Age wise various biometrical parameters of third lobe of thymus of Hansli chicken (HC) and Vencobb broiler chicken (VC)

Parameters		Left			Right		
		4 wks	12 wks	24 wks	4 wks	12 wks	24 wks
Weight (gm)	VC	0.19±0.003	0.49±0.02	0.12±0.006	0.18±0.001	0.43±0.007	0.10±0.004
	HC	0.16±0.001	0.37±0.01	0.10±0.002	0.14±0.004	0.39±0.002	0.08±0.001
Length (mm)	VC	0.23±0.001	0.49±0.11	0.15±0.003	0.23±0.004	0.60±0.03	0.12±0.002
	HC	0.23±0.04	0.37±0.02	0.12±0.006	0.22±0.01	0.32*±0.02	0.09±0.002
Cranial width (mm)	VC	0.14±0.005	0.38±0.009	0.10±0.02	0.14±0.003	0.43±0.03	0.08±0.001
	HC	0.12±0.01	0.29±0.004	0.09±0.001	0.13±0.02	0.30*±0.002	0.07±0.002
Middle width (mm)	VC	0.22±0.008	0.48±0.02	0.17±0.002	0.17±0.008	0.58±0.04	0.11±0.005
	HC	0.14*±0.008	0.34±0.02	0.11±0.001	0.15±0.01	0.42±0.02	0.09±0.006
Caudal width (mm)	VC	0.11±0.003	0.26±0.009	0.07±0.002	0.12±0.006	0.37±0.02	0.06±0.001
	HC	0.10±0.002	0.22±0.01	0.05±0.006	0.11±0.008	0.27±0.01	0.04±0.002
Cranial thickness (mm)	VC	0.31±0.02	0.47±0.10	0.17±0.001	0.30±0.01	0.45±0.03	0.14±0.008
	HC	0.22±0.005	0.41±0.02	0.15±0.002	0.16±0.004	0.39±0.002	0.11±0.002
Middle thickness (mm)	VC	0.37±0.001	0.63±0.01	0.20±0.002	0.33±0.002	0.58±0.02	0.18±0.01
	HC	0.24*±0.01	0.53*±0.005	0.16±0.006	0.21±0.01	0.51*±0.01	0.17±0.001
Caudal thickness (mm)	VC	0.27±0.02	0.38±0.007	0.13±0.001	0.23±0.02	0.40±0.006	0.12±0.001
	HC	0.18±0.002	0.30±0.02	0.12±0.002	0.12±0.001	0.29*±0.004	0.09±0.001

Values bearing superscript (*) differ significantly in row $p \leq 0.05$

cranial width of the third lobe of the right thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the middle width of the third lobe of the right thymus was found to be significant ($p \leq 0.05$) in 4th week of age between the birds.

The difference in the middle thickness of the third lobe of the left thymus was found to be significant ($p \leq 0.05$) in 4th week and 12th week of age between the birds.

Table 4

Age wise various biometrical parameters of fourth lobe of thymus of Hansli chicken (HC) and Vencobb broiler chicken (VC)

Parameters		Left			Right		
		4 wks	12 wks	24 wks	4 wks	12 wks	24 wks
Weight (gm)	VC	0.18±0.01	0.46±0.07	0.12±0.02	0.20±0.01	0.47±0.006	0.16±0.01
	HC	0.15±0.007	0.39±0.02	0.10±0.006	0.14±0.002	0.33*±0.009	0.10±0.001
Length (mm)	VC	0.13±0.03	0.50±0.10	0.10±0.004	0.19±0.03	0.36±0.05	0.12±0.002
	HC	0.14±0.02	0.43±0.03	0.08±0.002	0.16±0.01	0.36±0.01	0.10±0.001
Cranial width (mm)	VC	0.23±0.02	0.45±0.02	0.15±0.02	0.15±0.006	0.46±0.01	0.16±0.01
	HC	0.16*±0.001	0.43±0.002	0.11±0.002	0.12±0.002	0.33±0.003	0.13±0.01
Middle width (mm)	VC	0.30±0.01	0.52±0.009	0.18±0.004	0.18±0.009	0.49±0.02	0.19±0.002
	HC	0.23±0.01	0.48±0.01	0.05±0.001	0.15±0.01	0.39±0.003	0.16±0.001
Caudal width (mm)	VC	0.12±0.01	0.31±0.008	0.09±0.003	0.10±0.001	0.37*±0.002	0.12±0.009
	HC	0.10±0.004	0.26±0.009	0.07*±0.002	0.11±0.02	0.28±0.02	0.09±0.002
Cranial thickness (mm)	VC	0.16±0.003	0.40±0.02	0.12±0.004	0.19±0.004	0.33±0.02	0.14±0.001
	HC	0.12±0.01	0.36±0.01	0.10±0.002	0.16±0.004	0.29±0.01	0.11±0.001
Middle thickness (mm)	VC	0.20±0.01	0.51±0.03	0.15±0.01	0.20±0.002	0.54±0.01	0.15±0.002
	HC	0.16±0.02	0.48±0.008	0.13±0.002	0.18±0.01	0.46±0.02	0.14±0.003
Caudal thickness (mm)	VC	0.12±0.002	0.37±0.02	0.09±0.001	0.18±0.006	0.28±0.01	0.11±0.001
	HC	0.11±0.01	0.29±0.01	0.08±0.002	0.13±0.001	0.24±0.001	0.09±0.001

Values bearing superscript (*) differ significantly in row $p \leq 0.05$

Table 5

Age wise various biometrical parameters of fifth lobe of thymus of Hansli chicken (HC) and Vencobb broiler chicken (VC)

Parameters		Left			Right		
		4 wks	12 wks	24 wks	4 wks	12 wks	24 wks
Weight (gm)	VC	0.10±0.003	0.55±0.009	0.08±0.001	0.08±0.003	0.44±0.01	0.06±0.002
	HC	0.10±0.02	0.48±0.03	0.06±0.006	0.08±0.01	0.39±0.002	0.06±0.001
Length (mm)	VC	0.17±0.01	0.50±0.02	0.12±0.006	0.17±0.01	0.36±0.07	0.13±0.002
	HC	0.17±0.02	0.46±0.02	0.10±0.002	0.14±0.001	0.43±0.02	0.10±0.001
Cranial width (mm)	VC	0.13±0.004	0.57±0.009	0.10±0.003	0.12±0.001	0.42±0.01	0.12±0.003
	HC	0.11±0.01	0.53±0.004	0.09±0.001	0.11±0.002	0.38*±0.004	0.10±0.006
Middle width (mm)	VC	0.17±0.002	0.65±0.02	0.12±0.003	0.16±0.002	0.44±0.005	0.13±0.002
	HC	0.14±0.006	0.62±0.02	0.10±0.002	0.14±0.01	0.40±0.003	0.12±0.001
Caudal width (mm)	VC	0.12±0.002	0.45±0.03	0.08±0.01	0.12±0.01	0.38±0.006	0.11±0.001
	HC	0.09±0.002	0.42±0.01	0.05±0.006	0.09±0.01	0.32±0.007	0.08±0.001
Cranial thickness (mm)	VC	0.22±0.003	0.47±0.02	0.14±0.002	0.15±0.001	0.38±0.002	0.11±0.001
	HC	0.18±0.001	0.34±0.02	0.12±0.006	0.14±0.01	0.31±0.01	0.10±0.002
Middle thickness (mm)	VC	0.19±0.01	0.76±0.02	0.12±0.002	0.17±0.01	0.57±0.01	0.12±0.002
	HC	0.13±0.007	0.56±0.08	0.11±0.006	0.15±0.01	0.47±0.02	0.11±0.001
Caudal thickness (mm)	VC	0.15±0.02	0.39±0.03	0.12±0.003	0.12±0.006	0.34±0.02	0.10±0.01
	HC	0.12±0.009	0.28*±0.01	0.09±0.002	0.10±0.002	0.23*±0.01	0.08±0.002

Values bearing superscript (*) differ significantly in row $p \leq 0.05$

The difference in the middle thickness of the third lobe of the right thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds.

(d) Fourth lobe

The biometric observations are presented in table 4.

The difference in the weight of the fourth lobe of the right thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the

Table 6

Age wise various biometrical parameters of sixth lobe of thymus of Hansli chicken (HC) and Vencobb broiler chicken (VC)

Parameters		Left			Right		
		4 wks	12 wks	24 wks	4 wks	12 wks	24 wks
Weight (gm)	VC	0.08±0.001	0.20±0.01	0.06±0.002	0.08±0.001	0.17±0.02	0.07±0.005
	HC	0.08±0.01	0.18±0.009	0.05±0.001	0.08±0.002	0.15±0.001	0.06±0.003
Length (mm)	VC	0.27±0.03	0.47±0.02	0.12±0.002	0.23±0.007	0.33±0.05	0.11±0.01
	HC	0.26±0.01	0.39±0.01	0.12±0.01	0.27±0.03	0.36±0.001	0.12±0.002
Cranial width (mm)	VC	0.18±0.009	0.62±0.02	0.08±0.001	0.15±0.002	0.53±0.005	0.05±0.003
	HC	0.16±0.01	0.55±0.002	0.07±0.001	0.11±0.009	0.49±0.002	0.04±0.002
Middle width (mm)	VC	0.22±0.02	0.70±0.01	0.09±0.003	0.18±0.01	0.62±0.06	0.11±0.001
	HC	0.18±0.001	0.60±0.004	0.06±0.002	0.14±0.01	0.53±0.01	0.09±0.001
Caudal width (mm)	VC	0.12±0.02	0.56±0.03	0.16±0.003	0.13±0.001	0.41±0.01	0.04±0.002
	HC	0.09±0.01	0.48±0.002	0.05*±0.001	0.09±0.001	0.37±0.004	0.03±0.001
Cranial thickness (mm)	VC	0.15±0.001	0.36±0.02	0.10±0.003	0.14±0.004	0.35±0.002	0.13±0.001
	HC	0.15±0.003	0.32±0.01	0.09±0.002	0.14±0.01	0.32±0.01	0.10±0.003
Middle thickness (mm)	VC	0.18±0.01	0.47±0.05	0.11±0.001	0.17±0.003	0.44±0.003	0.14±0.001
	HC	0.17±0.002	0.35±0.01	0.10±0.002	0.16±0.001	0.39±0.01	0.12±0.002
Caudal thickness (mm)	VC	0.14±0.01	0.29±0.02	0.09±0.002	0.12±0.003	0.30±0.005	0.09±0.002
	HC	0.11±0.001	0.27*±0.008	0.07±0.002	0.10±0.001	0.29±0.003	0.08±0.001

Values bearing superscript (*) differ significantly in row $p \leq 0.05$

cranial width of the fourth lobe of the left thymus was found to be significant ($p \leq 0.05$) in 4th week of age between the birds. The difference in the caudal thickness of the fourth lobe of the left thymus was found to be significant ($p \leq 0.05$) in 24th week of age between the birds.

(e) Fifth Lobe

The biometric observations are presented in table 5.

The difference in the cranial width of the fifth lobe of the right thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the caudal thickness of the fifth lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The difference in the caudal thickness of the fifth lobe of the right thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds.

(f) Sixth lobe

The biometric observations are presented in table 6.

The difference in the caudal width of the sixth lobe of the left thymus was found to be significant ($p \leq 0.05$) in 24th week of age between the birds. The difference in the caudal thickness of the sixth lobe of the left thymus was found to be significant ($p \leq 0.05$) in 12th week of age between the birds. The morphometrical data of the lobes of thymus in the birds under study could not be compared due to availability of scanty literature in this field.

CONCLUSION

The study provided a detailed baseline data on the age-wise development of thymus in Hansli chicken and Vencobb broiler chicken which could be correlated with various molecular techniques in the characterization of the age-related immunogenic potency of these two breeds of poultry and basing on the outcome, they could be recommended to the farmers for rearing purpose.

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