

RESEARCH CONCERNING HISTOSTRUCTURE OF CECAL TONSILS IN SOME SPECIES OF DOMESTIC BIRDS

B. GEORGESCU, EMILIA CIOBOTARU, G. PREDOI, N. CORNILA

Faculty of Veterinary Medicine Bucharest, Romania

Summary

Researches were carried out on two domestic gallinaceae species – the domestic hen (*Gallus domesticus*) and the Japanese quail (*Coturnix coturnix japonica*) and two domestic palmiped species – the domestic duck (*Anas domesticus* sin. *Anas platyrinchos*) and the domestic goose (*Anser domesticus* sin. *Anser anser*).

All fowls were adult. In a symmetrical position as to the ileum and supported by ileocecal ligaments, the ceca are caudalo-cranially oriented; both free cranial extremities are caudally recurved. The caudal extremity of each cecal sac is opened at the limit between ileum and colon. The cecal tonsils are located close to the ceca openings, at the limit between ileum and colon, in the ceca walls. From a histological point of view, the tonsils are covered with a monostratified epithelium associated to follicles. The lymphoid tissue is formed of germinative centres and lymphocytes homogenously positioned. The centres are positioned close to the muscular or at the base of the cecal tonsil folds. In the cecum wall, in the ileocecal ligament insertion point there is diffuse lymphoid tissue in the mucous membrane. In geese there are nodules with obvious lymphatic sinus in the cecum mucous depth and even in it's muscular.

Materials and methods

In the research there were used 20 fowls of various sex, breeds and breeding standards from intensive breeding industrial units and from private breeders. Only conventional fowls were used, fowls that were subject to the current prophylaxis program (only hens from intensive breeding industrial units). Researches were carried out on two domestic gallinaceae species – the domestic hen (*Gallus domesticus*) and the Japanese quail (*Coturnix coturnix japonica*) and two domestic palmiped species – the domestic duck (*Anas domesticus* sin. *Anas platyrinchos*) and the domestic goose (*Anser domesticus* sin. *Anser anser*).

Researches were carried out on fresh fowl cadavers injected intrabulbarly with 4 per cent solution of Xiline.

The study, description and homologation of the formations were in accordance to *Nomina Anatomica Avium – 1979* and *Nomina Anatomica Veterinaria, Nomina Histologica* and *Nomina Embryologica – 1994*.

The dissection was the most used method in this research.

Thus, the animal was positioned on the dissection table either in lateral decubitus, or in dorsal decubitus – according to the area to be studied. The dissection was executed bilaterally and on successive sections up to the visibility limit using the stereo-microscope type SMZ-2T NIKON located in the Laboratory of

Domestic Animal Anatomy, the School of Veterinary Medicine, Bucharest, Romania. The stereomicroscope is provided with a photo system to take macroscopic images.

The research was carried out on permanent microscopic material created in the Pathological Anatomy laboratory, School of Veterinary Medicine, Bucharest, Romania.

For the making of the permanent microscopic material, there were taken fragments from the lymphoid formations highlighted pursuant dissection; also, by using the „blind method”, (under no macroscopic visibility circumstances) there were taken formations from areas which had been noticed by various authors as topographic location.

The entire material was examined, interpreted and photographed in the Cell Biology, Histology and Embryology Laboratory, using a LABOPHOT 2 – NIKON microscope provided with a photo system to take microscopic images NIKON FX – 35 DX.

Results and discussions

The thoracoabdominal cavity was opened. After having raised the jejunal ansae the two cecal sacs that flank the ileum were studied. Using the scalpel two sections were performed: the former – at the ileocecal limit and the latter – anterior as to the cecal tonsils.

The resulted segment was taken out for a histologic analysis. There were also taken segments from the cecal wall – especially from the ileocecal ligament area – as it is already known that the diffuse lymphoid tissue is present especially in this area. The taken fragments were subject to the protocol for the histological preparations.

The cecal tonsils were covered with a monostratified epithelium associated to follicles. The lymphoid tissue was formed of germinative centres and lymphocytes homogenously positioned.

There were no noticeable differences between the epithelium that covers the cecal tonsils and the digestive one. The only special feature was represented by the reduced presence of the cupshaped cells in the folds depth.

The germinative centres were positioned close to the muscular or at the base of the cecal tonsil folds.

The centres were formed mainly of lymphoblasts surrounded by a small number of plasmocytes. The digestive glands and the mucous membrane muscular were intercalated among the lymphoid aggregates (see fig. 1, 2, 3).

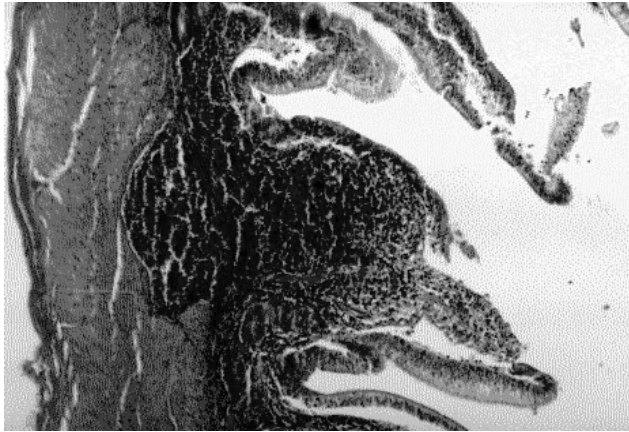


Fig. 1. Two months' hen cecal tonsil (H.E.A., ob. 4).
Note the villi in the point limit between the cecal mucous membrane and the cecal tonsils;
also note the lymphocyte population which is well represented (original).

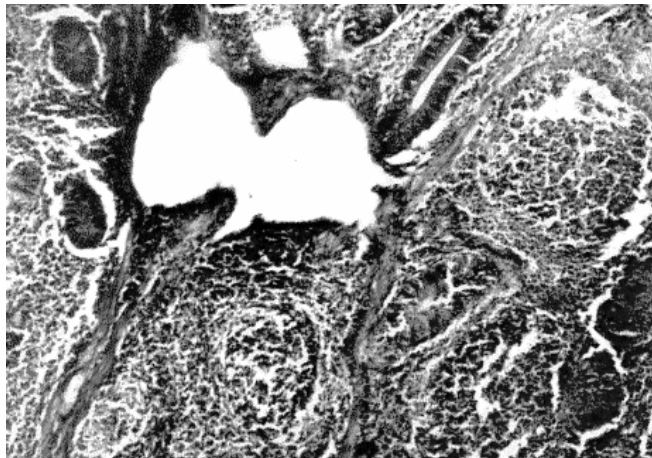


Fig. 2. Two months' hen cecal tonsil (H.E.A., ob. 10).
Note the lymphoid nodules situated in the diffuse lymphocyte population (original).

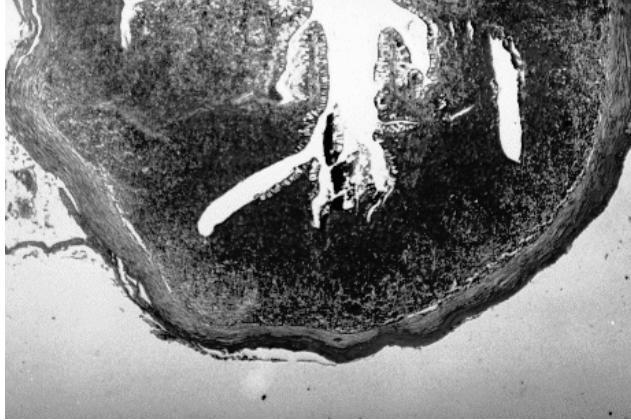


Fig. 3. Two months' Japanese quail cecal tonsil (H.E.A., ob. 4).
Note the villi, the numerous lymphoid cells and germinative centres to become (original).

In the cecal wall there was a diffuse lymphoid tissue which was present especially in the serous insertion point (the ileocecal ligament). In geese and ducks the diffuse lymphoid population could be visualised in the mucous membrane superficial layer and nodules with obvious lymphatic sinus could be seen in the cecal mucous depth (see fig. 4, 5, 6).

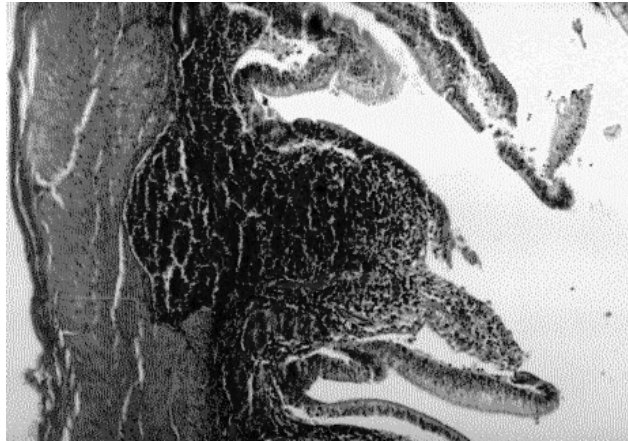


Fig. 4. Twelve months' duck cecum (H.E.A., ob. 10). Lymphoid population in villi and also in submucosa (original).

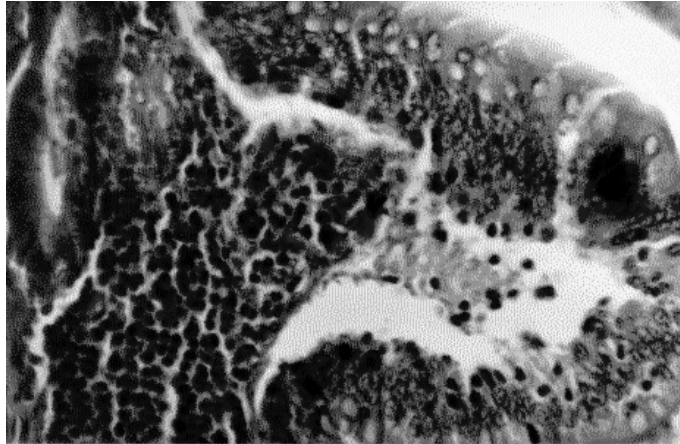


Fig. 5. Twelve months' duck cecum (H.E.A., ob. 40). Note the lymphoid cell in the intraepithelial area (original).

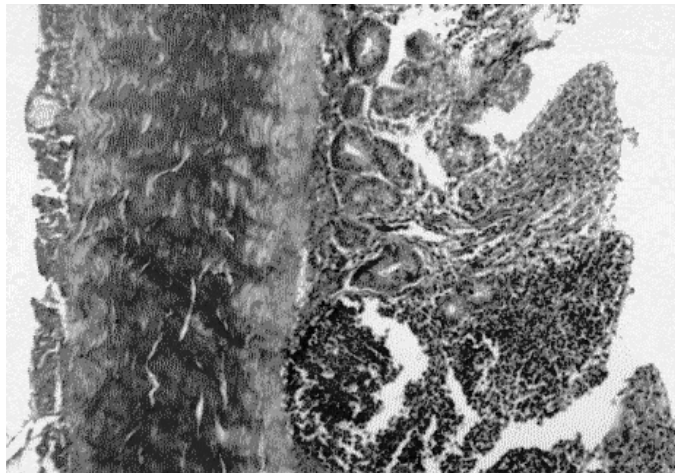


Fig. 6. Three months' goose cecum (H.E.A., ob. 10). The lymphoid nodule with obvious lymphatic sinus located in the mucous membrane depth; diffuse lymphoid population in the mucous membrane superficial layer (original).

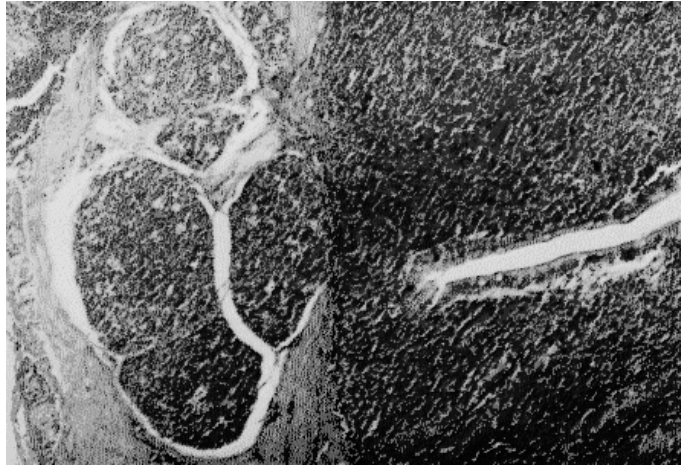


Fig. 7. Twelve months' duck cecum (H.E.A., ob. 10). Lymphoid population in the muscularous (original).

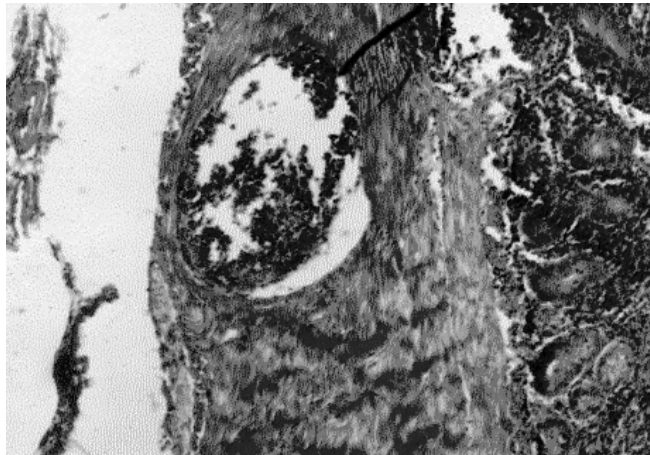


Fig. 8. Three months' goose cecum (H.E.A., ob. 10). Intramuscular lymphoid nodule (original).

In geese and ducks intramuscular lymphoid nodules could be seen in the ceca musculous (see fig. 7, 8).

Conclusions

1. The cecal tonsils were represented by macroscopic ovalar lymphoid formations or under the shape of a circular sleeve situated at the caudal extremity of each cecum, close to the colic ileocecal orifice.
2. The tonsils were covered with a monostratified epithelium associated to follicles. The lymphoid tissue was formed of germinative centres and lymphocytes homogenously positioned. The centres were positioned close to the muscular or at the base of the cecal tonsil folds.
3. In the cecum wall, in the ileocecal ligament insertion point there was lymphoid tissue diffuse in the mucous membrane. In geese there were nodules with obvious lymphatic sinus in the cecum mucous depth and even in its muscular.
4. In geese and ducks intramuscular lymphoid nodules could be seen in the ceca musculous.

References

1. **Bacha, W.J.; Linda Wood** – Color Atlas of Veterinary Histology. Lea & Febiger Comp., Philadelphia – London, 1990.
2. **Bancroft, J.D.; Stevens, A.** – Theory and Practice of Histological techniques (Fourth Edition). Churchill – Livingstone Press, New York – Edinburgh – London – Madrid – Melbourne – San Francisco – Tokyo, 1996.
3. **Banks, W.J.** – Applied Veterinary Histology (second edition). Williams and Wilkins Comp., Baltimore, 1986.
4. **Botărel, S.; Cotea, C.; Gaboreanu, M.** – Histologie și embriologie. Ed. didactică și pedagogică, București, 1982.
5. **Cacho del, E.; Gallego, M.; Sanz, A.; Zapata, A.** – Characterization of distal lymphoid nodules in the chicken caecum. Anatomical Record 237 (4), 512 – 517, 1993.
6. **Ciobotaru, Emilia** – Studii morfofuncționale ale celulelor imunitare la pasăre. Teză F.M.V., București, 1998.
7. **Cornilă, N.; Manolescu, N.** – Structura și ultrastructura organelor la animalele domestice. Ed. Ceres, București, 1995.
8. **Cornilă, N.** – Morfologia microscopică a animalelor domestice (cu elemente de embriologie), Vol. I. Ed. BIC ALL, București, 2000.
9. **Hodges, R.D.** – The histology of the fowl. Academic Press Inc., London – New York – San Francisco, 1974.
10. **King, A.S.; McLelland, J.** – BIRDS – their structure and function. Second Edition. Ed. Baillere tindall, London – Philadelphia – Toronto – Mexico City – Rio de Janeiro – Sydney - Tokyo – Hong Kong, 1984.

LUCRĂRI ȘTIINȚIFICE MEDICINĂ VETERINARĂ VOL. XL, 2007, TIMIȘOARA

11. **Georgescu, B.** - Morfologia sistemului limfatic la păsările domestice. Ed. Printech, București, 2001,
12. * * * - **Nomina Anatomica Avium.** Academic Press, London – Toronto – New York – Sydney – San Francisco, 1979.
13. * * * - **Nomina Anatomica Veterinaria** (Fourth Edition) together with Nomina Histologica (Revised Second Edition) and Nomina Embryologica Veterinaria. Zürich and Ithaca, New York, 1994.