MORPHOLOGICAL STUDIES ON THE UROPYGIAL GLAND OF BELTSVILLE SMALL WHITE BREED OF TURKEYS *(Meleagris gallopavo)*

S. Rajathi[1], N. Ashok[2], K.R. Harshan[3], Jose John Chungath[4] and K.S. Sujatha[5]

Department of Veterinary Anatomy and Histology
College of Veterinary and Animal Sciences
Mannuthy - 680651,Thrissur, Kerala

Though a large number of literature are available on the gross anatomical aspects of the uropygial gland in domestic birds (Lucas and Stettenheim, 1972; Farner *et al.,* 1982), the information of the gland in the turkey is scanty. The present study is an attempt to bridge this deficiency and to trace the gross structure, various physical parameters and the percentage body weight of the gland in Beltsville small white breed of turkey.

Materials and Methods

Uropygial glands collected from 16 turkeys of both the sexes in the age group of nine months were utilized for the present study. Gross observations were made after removing the skin covering the glands. Various measurements of right and left lobes and the papilla were taken and percentage body weight was calculated. The data were analyzed statistically (Snedecor and Cochran, 1985).

Results and Discussion

The uropygial gland is a cutaneous gland present in turkey. It is better developed in aquatic species of birds than land birds (Kendall, 1947; Young, 1962; Nickel *et al.,* 1977, Farner *et al.,* 1982). Among land birds, the uropygial glands are well developed in domestic birds like fowl and Japanese quail (Lucas and Stettenheim, 1972). The secretion of these glands (containing scent) in turkey may have a role in intraspecies communication as opined by Jacob *et al.* (1979).

The uropygial gland in turkey appeared as an unpaired bilobed gland. Similar observations were made in the fowl and in the Japanese quail by Apandi and Edwards (1964) and Lucas and Stettenheim (1972). The uropygial glands were located on the dorsal surface of the synsacral region extending from the second to fourth coccygeal vertebrae while it was reported to be located over the last sacral vertebra in fowl (Bradley and Grahame, 1950). The lobes were directed forward and outward. The dorsal surface of the glands was convex while the ventral surface was somewhat flattened because of its relation with the muscles of the tail. The gland was related to coccygeus lateralis muscle ventrally and coccygeus muscle ventrolaterally as reported in other domestic birds by Apandi and Edwards (1964).

The lobes of the uropygial gland were pear shaped. This concurs with the findings of Lucas and Stettenheim (1972) in turkey, chicken and duck while they were reported to

[1] *Research scholar*
[2] *Professor and Head, Department of Veterinary Anatomy and Histology, CoVAS., Pookot, Wayanad*
[3] *Professor and Head*
[4] *Professor*
[5] *Assistant Professor (SG) and Head, Department of Statistics*

be oblong in Japanese quail (Farner *et al.*, 1982). The glands were creamy yellowish in colour as reported by Sunanda *et al.* (2001) in ducks.

The common papilla of the gland was thick and long as reported by Lucas and Stettenheim (1972) in domestic chicken. It was quadrilateral in duck (Sunanda *et al.*, 2001). The papilla was surrounded by skin with small feathers, which extended from posterodorsal end of the glands and was directed dorsocaudally as in chicken (Lucas and Stettenheim, 1972). The secretion from the gland was reported to be removed by their beaks and spread over plumage (Nickel *et al.*, 1977). The axis of the papilla and the lobes lied almost in one line as reported by Farner *et al.* (1982) in chicken. The base of the papilla or isthmus was broader than the tip of the papilla. The common papilla contained a single duct, which conveyed secretions from both the lobes to the exterior. Similar observations were made in fowl and Japanese quail by Farner *et al.* (1982). Contrary to this, Sunanda *et al.* (2001) reported that two separate ducts were present in the common papilla, in ducks.

The physical parameters such as the mean weight , length, width and thickness of the right and left lobes and the weight, length and width of the papilla are shown in Table. The two lobes were symmetrical. The length of the papilla was two-third of the length of the lobe and the lobes were twice thicker than the papilla. However, Sunanda *et al.* (2001) noticed that two uropygial glands in duck were asymmetrical. In White Leghorn birds, the gland constituted 0.07 percentage of body weight (Hodges, 1974) while in ducks 0.27 per cent (Sunanda *et al.*, 2001) whereas in turkeys it constituted only 0.01 percentage of the total body weight.

The uropygial gland derived their arterial supply from paired branches of caudal artery, which is in accordance with the findings of Lucas and Stettenheim (1972) and Farner *et al.* (1982) in other domestic birds.

Table. Various morphological parameters of uropygial gland (Mean ±SE) and their correlation in Beltsville small white breed of turkeys

Parameters	Mean ± SE	Correlation coefficients of uropygial gland parameters to body weight
Body weight	7.01 ± 0.11 kg	———
Gland weight	0.93 ± 0.04 g	0.943**
Papilla weight	0.14 ± 0.01 g	0.854**
Right lobe length	0.97 ± 0.02 cm	0.287
Left lobe length	0.96 ± 0.02 cm	0.332
Right lobe width	0.86 ± 0.01 cm	0.238
Left lobe width	0.86 ± 0.01 cm	0.150
Right lobe thickness	0.57 ± 0.01 cm	-0.074
Left lobe thickness	0.57 ± 0.01 cm	-0.097
Papilla length	0.64 ± 0.0 l cm	-0.310
Papilla thickness	0.47 ± 0.01 cm	0.240
Per cent gland weight to body weight	0.01 ± 0.01 cm	0.849**

** *Highly significant (P < O.01)*

Highly significant positive correlation was noticed between body weight and gland weight ($r = 0.943$), body weight and papilla weight ($r = 0.854$) and body weight and per cent gland weight ($r = 0.849$).

Summary

A morphological study was conducted on uropygial glands of 16 adult Beltsville small white turkeys. The lobes of the uropygial glands were pear shaped and creamy yellowish in colour. It was located on the dorsal surface of the synsacral region extending from second to fourth coccygeal vertebrae. The gland constituted 0.01 % of total body weight. Both the lobes had similar length, width and thickness. The waxy glandular secretion was discharged through a common papilla. The glands derived their arterial supply from the caudal artery.

References

Apandi, M. and Edwards, J.R.H.M. 1964. Studies on the composition of the secretions of the uropygial gland of some avian species. *Poult. Sci.,* **43**: 1445- 1462.

Bradley, O.C. and Grahame, T. 1950. *The Structure of the Fowl.* 3rd ed. Oxford University Press, London. 672 p.

Farner, D.S., King, J.R. and Parkes, K.C. 1982. The Uropygial Gland. In: *Avian Biology.* Vol. VI. Academic Press Inc., New York. 490 p.

Hodges, R.D. 1974. The integumentary system. In: *The Histology of the fowl.* Academic Press. London. 572 p.

Jacob, J., Balthzart, J. and Schoffenicls, E. 1979. Sex differences in the chemical composition of uropygial gland waxes in domestic duck. *Biochem. Syst. Ecof.,* **7**: 149-153.

Kendall. 1947. *Microscopic Anatomy of Vertebrates.* Lea and Febiger, Philadelphia. 154 p.

Lucas, A.M. and Stettenheim, P.R. 1972. *Avian Anatomy. Integument. Part II. Agricultural handbook.* United States. 362 p.

Nickel. R., Schummer, A. and Seifferle, E. 1977. *Anatomy of the domestic birds.* Verlag Paul Parey. Berlin. 20 p.

Snedecor, G.W. and Cochran, W.G. 1985. *Statistical Methods.* 7th ed. The Iowa State University Press, USA, 313 p.

Sunanda, K., Chandra Sekhara Rao, T.S., Nagamalleswari, Y., Shanti Lakshmi, M., Jagapathi Ramayya, P. and Purushottham, G. 2001. Gross Anatomical studies on the uropygial gland of the domestic duck *(Anas boschas domesticus). Indian J. Vet. Anat.* **13**: 11-16.

Young, J. Z. 1962. *The Life of Vertebrates.* 3rd ed. Clarenden Press, Oxford, 645 p.

❑