Age Related Gross Morphological Studies on Ovarian Follicles in Punjab White Quail

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ABSTRACT

The present study was conducted on the ovaries of 24 Punjab white quails. The study revealed that ovary was grayish in color, ovoid in shape and granular in appearance containing numerous small follicles at 8 weeks, grayish yellow in color and became irregular at 16 weeks, large yellow follicles present and resembled bunch of grapes at 24 weeks and became irregularly lobulated at 30 weeks. Three types of ovarian follicles were observed and classified based on their diameter as small (2-4 mm), medium (4-6 mm) and large sized follicles (14-19 mm). The number of small follicles was maximum (32.33 ± 0.61) at 8 weeks of age and that of medium (8.66 ± 0.47) and large follicles (4.83 ± 0.28) at 24 weeks of age which is considered to be the most active reproductive period in these female birds.

Keywords: Ovarian follicle - Gross - Age related changes - White Quail

In India quail was introduced two decades ago and has partially replaced the domestic fowl both in research and open market for human consumption. The quail originally domesticated around 11th century as a pet song bird, is now highly valued (Mizutani 2003 and Kayang et al., 2004). The quail ovary contains thousands of follicles of various sizes and provides a unique model for the study of follicular development (Bharti et al., 2009; Blendea et al., 2012). The literature is available on the gross morphological studies on ovary of pigeon (Reibeiro et al., 1995), Rhode Island Red breed of poultry (Banerjee et al., 2006), emu (Reed Jr. et al., 2010), Pati and Chara-Chemballi ducks (Deka et al., 2015). This study will focus on gross morphology of ovarian follicles of Punjab white quail at different age groups.

MATERIALS AND METHODS

The present study was conducted on ovaries of 24 Punjab white quails. Before collections of samples, the ovaries were thoroughly examined for any pathological lesions. The ovaries of different aged birds were collected from poultry farm, GADVASU, Ludhiana. The female birds of various ages were selected and grouped as 8 weeks, 16 weeks, 24 weeks and 30 weeks of age. The birds were decapitated. After opening abdominal cavities, the number of ovarian follicles were counted and categorized into 3 types (small, medium and large) based on their diameter.

RESULTS AND DISCUSSION

In Punjab White Quail, only left ovary was found in all the birds. The ovary was situated on cranio-dorsal part of abdominal cavity close to midline, ventral to aorta and caudal vena cava and was close to last two ribs (Fig.1&2). Cranially, the ovary was related to caudal border of left lung (Fig.3). On ventral side, ovary was related to abdomen, left kidney and adrenal gland. The base of ovary was attached to dorsal wall of abdomen by fold of peritoneum called mesovarium (Fig.4) as reported by Reed Jr. et al. (2010) in Emu. On contrary to this, Gonzalez-Moran (2011) found that left and right ovaries lay on ventromedial surface of the mesonephros with the dorsal aorta between them. The position of right ovary was even more oblique than that of the left in chicken.

Ovary of 8 weeks was grayish in colour, ovoid in shape with granular surface (Fig.1). The entire ovary was covered by protruding follicles at different stages of development. Similarly, Dahl (1972) and Ribeiro et al. (1995) have reported that ovary was large organ composed of five to seven large follicles filled with yellow yolk and large number of small follicles of pale colour in domestic fowl and pigeon, respectively and Kimaro (2006) also reported a granular ovary due to presence of numerous follicles in Ostrich. The follicles were more on lateral and ventral side but follicles were few on the dorsal side. Small follicles were grayish white in colour and prominent whereas few yellow yolk healthy follicles were also reported. Few hemorrhagic areas were also observed on the follicular surface at this stage. At this age, the average numbers of small and medium follicles were found to be 32.33 ± 0.611 and 4.66 ± 0.3, respectively (Table 1). The present results showed that the small follicles were more in number as compared to large size follicles.

With the advancement of age, ovary of 16 weeks became irregular, grayish yellow in colour. Different follicles were seen on the ventral surface of ovary. Most of these follicles were whitish while some yellowish colored were also observed (Fig. 2). Similar findings have

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been reported earlier by Banerjee et al. (2006) in Rhode Island Red breed. The quantitative study showed that the average number of small, medium and large follicles were found to be $25.33 \pm 0.8$, $7.66 \pm 0.38$ and $2.16 \pm 0.28$, respectively (Table 1). The number of small sized follicles was less as compared to 8 weeks of age.

The ovary of 24 weeks was yellow to brown in color with numerous ovarian follicles resembling the bunch of grapes. The average number of small follicles was found to be $13.5 \pm 0.77$, medium follicles as $8.66 \pm 0.47$ and large follicles were $4.83 \pm 0.28$, respectively (Table 1). In this age group medium to large follicles were more and small sized follicles had greatly reduced in number than previous age group. This may be related to the reproductive efficiency and maturation of ovary at this age. The above findings were in accordance with hen (Hassan et al., 2013).

The large spherical and orange follicles were connected by a long pedicle to the ovary (Fig 3). Similar findings have been reported earlier by Cediel (2007) in brood parasitic bird and Claver et al. (2008) in Spotted Tinamous.

Ovary of 30 weeks was irregularly lobulated as it had numerous ova in cortex. The colour became pinkish. Few large follicles protruded out from surface and it looked like a bunch of grapes (Fig 4). Similarly, Mirhish and Nasaif (2013) observed that ovary had an irregular surface in Indigenous Turkey hen. However, Vijayakumar et al. (2014) reported that ovary was dark brown to black in colour with numerous ovarian follicles concentrated on the ventral surface in Emu. The average number of small follicles was found to be $6 \pm 0.47$, medium follicles as $5.33 \pm 0.51$ and large follicles were $3.33 \pm 0.19$, respectively (Table 1). The present data showed that the number of all types of follicles were less at 30 weeks of age in Punjab white quail as compared to other age groups. This may be due to the presence of ruptured follicles to release the yolk from the matured follicles.

### Table 1: Data on diameter and number of visible surface ovarian follicles in Punjab white quail

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>2-4 mm</th>
<th>6-9 mm</th>
<th>14-19 mm</th>
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<tbody>
<tr>
<td></td>
<td>8 weeks</td>
<td>16 weeks</td>
<td>24 weeks</td>
</tr>
<tr>
<td>1</td>
<td>30</td>
<td>28</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>33</td>
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<tr>
<td>6</td>
<td>34</td>
<td>22</td>
<td>15</td>
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<tr>
<td>Mean</td>
<td>32.33</td>
<td>25.33</td>
<td>13.5</td>
</tr>
<tr>
<td>± S.E.</td>
<td>$\pm 0.611$</td>
<td>$\pm 0.8$</td>
<td>$\pm 0.77$</td>
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</tbody>
</table>

Fig. 1: Ovary at 8 weeks of age
Fig. 2: Ovary at 16 weeks of age
Fig. 3: Ovary at 24 weeks of age
Fig. 4: Ovary at 30 weeks of age

The present findings showed that the ovaries of Punjab white quail contained small, medium and large sized follicles classified on the basis of their diameter and gross morphology. The number of
small follicles was maximum at 8 weeks of age and that of medium and large follicles at 24 weeks of age which is considered to be the most active period in these female birds.

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