NOTE

Zygomatic Salivary Glands in Japanese Serows, *Capricornis crispus*

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**ABSTRACT.** This study shows that the Japanese serow, one of the wild bovidae in Japan, has the zygomatic salivary gland similar to that of some carnivores. This gland is located inside the zygomatic arch on either side, lying on the ventro-lateral part of the periorbita. Two or three ducts of this gland open at the surface of the buccal membrane near the root of the last upper molar tooth. Histological observation reveals that the gland of this species is predominantly serous in nature, unlike that of carnivores.—**Key words:** Japanese serow, zygomatic gland.

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It has been generally believed that the domestic species such as ruminants have no zygomatic salivary gland, except for some carnivores [2–4]. However, it has been demonstrated in the present study that the Japanese serow, one of the wild bovidae in Japan, is also endowed with this gland. The purpose of this study is to describe findings on the morphology of the zygomatic salivary gland in this species.

One hundred serows, captured in Gifu Prefecture during the period from 1978 to 1981, were used. The animals were dissected for visualization and morphological study of salivary glands. The weights of major salivary glands were recorded for each animal. Immediately after being isolated, the zygomatic gland was fixed in 10% formalin or Bouin’s solution, embedded in paraffin, and sectioned into 5 μm slices. The sections were stained with hematoxylin-eosin, PAS or alcian blue (pH 2.5).

The serows had a pair of zygomatic salivary glands in addition to the major salivary glands including the parotid, mandibular, monostromatic and polysomatic sublingual glands as found in usual domestic ruminants [4]. It has been found that the zygomatic gland of the serow is located inside the zygomatic arch on either side, lying buried in fat on the ventro-lateral part of the periorbita. The gland is a pyramid-shaped organ surrounded by a loose capsule and consists of a number of distinct dark flesh-colored lobules. Two or three ducts extend from the ventral apex of the gland to open at the surface of the buccal membrane close to the root of the last upper molar tooth (Fig. 1). The average weight of a unilateral zygomatic gland is 4.7 g in adult serows; it is less than that of the parotid or the mandibular gland, but greater than that of the sublingual gland (Table 1).

Histological observations have revealed that the zygomatic gland of the serow is a complex of tubular and acinar units, with the predominant portion being acinar serous units. A relatively small number of mucous cells are observed at the ventral end of the gland (Figs. 2 and 3). They form tubular secretory units or mixed units with the serous cells. The serous cell is observed as a

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<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parotid gland</td>
<td>18.1±4.1 E (34)</td>
<td>17.0±3.3 E (30)</td>
<td>17.6±3.8 E (64)</td>
</tr>
<tr>
<td>Mandibular gland</td>
<td>13.4±2.8 (33)</td>
<td>14.4±3.5 (29)</td>
<td>13.9±3.1 (62)</td>
</tr>
<tr>
<td>Sublingual gland</td>
<td>2.5±0.5 (34)</td>
<td>2.6±0.7 (27)</td>
<td>2.5±0.6 (61)</td>
</tr>
<tr>
<td>Zygomatic gland</td>
<td>4.6±1.3 (34)</td>
<td>4.9±1.7 (27)</td>
<td>4.7±1.5 (61)</td>
</tr>
</tbody>
</table>

Numeral shows mean±S.D. (right side), ( ) : Cases examined.
a) Monostomatic+polystomatic sublingual glands.

pyramid-shaped acidophilic cell with a round nucleus. The apex of each cell is filled with secretory granules. The mucous cell can be distinguished from the serous cell, since it exhibits a PAS-positive reaction and its nucleus is flattened at the base of the cell. The units are attached to a basement lamina which is supported by myoepithelial cells. The short intercalated duct is lined with slightly flattened cuboidal cells and is connected to the secretory duct which is composed of simple cuboidal or columnar cells with basal striations. The excretory duct consists of a simple- or bi-layered columnar epithelium with numerous goblet cells.

The dorsal buccal gland of the serow consists of mucous units as found in other domestic ruminants. Its location and structure resemble those of the ventral end of the zygomatic gland, and the boundary between the two glands is not clear. From this, it may be speculated that the dorsal buccal gland grows up to the ventral end of the zygomatic gland. But, since no mucous cells can be observed in
the dorsal portion of the zygomatic gland, this speculation seems unlikely.

The zygomatic salivary glands in carnivores, such as the dog [2, 3, 7], cat [1, 7, 8], ferret [5] and mongoose [6], are predominantly mucous in nature, whereas the homologous gland of the serow is predominantly serous. For this reason, this gland may be specifically characteristic of this species or its relatives.

Further comparative studies are needed to clarify the relationship between the relatives.

REFERENCES


要約
ニホンカモシカにおける頜骨腺の存在（短報）：土木信幸・菅野美樹夫・阿閉泰郎・鈴木義孝・杉村誠（岐阜大学農学部家畜解剖学教室）——反芻類ウシ科に属するニホンカモシカに頜骨腺が見出された。ニホンカモシカの頜骨腺は頜骨弓の内側に位置し、顔面骨膜の外側側部に接していた。頜骨腺管は内眼的に2-3本で、上顎の最後臼歯歯根部に面する頜粘膜に開口していた。組織学的には、従来報告されていた食肉目家畜のそれとは異なり、唾液細胞が大部分を占める混合腺であることが明らかとなった。