

On a New Species of *Elaphurus* (Cervid, Mammal) from Akishima City, Tokyo

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Introduction

In the summer of 1961, M. TAJIME, a teacher of a primary school of Akishima City, found many skeletons of whale in medium-grained sandstone, exposed on a floor of the Tama River. The site is situated about 36 meters west of a railway bridge of the Hachiko Line, near Seisho Primary School. After his discovery, the excavation was carried out by school teachers of Akishima City under the leadership of Dr. H. OZAKI, former curator of the National Science Museum of Tokyo. As the result of excavation, they obtained nearly complete and well preserved skeletons of a probably new genus and species of whale (temporarily called Akishima-kujira in Japanese name) and an antler of *Elaphurus* which is described in the present article.

Before this discovery, an incomplete antler specimen of *Elaphurus* was found by H. ARAI, student of a junior high school, also from the floor of the Tama River but at another locality, and it was identified to *Elaphurus akashiensis* by SHIKAMA (1964). According to him, the formation which yielded *E. akashiensis* is a part of the Hirayama Sand Bed, the lower part of the Minamitama Group of Y. OTSUKA (1932). The bed is composed of yellowish brown sand, overlying the Ôyabe Silt Bed, the basal part of the Group. From the Ôyabe Silt Bed, a molar of *Parastegodon akashiensis* was found before (TAKAI, 1938). The uppermost part of the Minamitama Group also yielded a tooth of *Parastegodon kwantoensis* (TOKUNAGA, 1934), and then is correlated with the "Villafranchian" Akashi Formation of the Ôsaka Group, western Japan. Thus *Parastegodon* ranges almost through the Minamitama Group. Therefore, SHIKAMA (1964) inclined to consider that the stratigraphic range of *Parastegodon* is not only restricted in the Villafranchian but extends to the pre-Villafranchian, i.e. the late Pliocene.

The newly found antler of *Elaphurus*, which was collected by Mr. Akira KANEKO, also came from the Hirayama Sand Bed and its locality is very close to that of *Elaphurus akashiensis* reported by SHIKAMA (1964).

Acknowledgements

Before going further, we wish to express our deep gratitude to Professor Shozo HAYASAKA of the Kagoshima University for his careful reading the manuscript. Our sincere thanks are also extended to Dr. Emile HEINTZ of Museum National d'Histoire Naturelle, Paris, for his kind advices on taxonomy of deer, and to Messrs. Akira KANEKO and Kaoru INABA for their courtesy in permitting us to study the collection.

Description

Order Artiodactyla

Family Cervidae, GRAY, 1821

Genus *Elaphurus* MILNE-EDWARDS, 1866

1866. MILNE-EDWARDS, A.: *Ann. Sci. Nat. (Zool.)*, **5**, 380–382.

1915. LYDEKKER, R.: *Cat. Ung. Mamm. Brit. Mus.*, **4**, 151–153.

1930. TEILHARD de C., P. & J. PIVETEAU: *Ann. Pal.* **19**, 46–48.

1936. ——— & C. YOUNG: *Pal. Sinica, ser. C*, **12**, fasc. 1, 30–38.

1936. SHIKAMA, T.: *Jub. Comm. Prof. Yabe*, **2**: 1161–1162.

1972. OTSUKA, H.: *Bull. Nat. Sci. Mus.*, **15**, (1), 197–210.

Subgenus *Elaphurus* (MILNE-EDWARDS, 1866) OTSUKA, 1972.

Type-species.—*Elaphurus (Elaphurus) davidianus* MILNE-EDWARDS, 1866.

Geologic range.—Late Pliocene to Recent.

The following three species are referable to the subgenus *Elaphurus*:

E. (Elaphurus) davidianus MILNE-EDWARDS, 1866, *E. (Elaphurus) menziesianus* TEILHARD and YOUNG, 1930, and *E. (Elaphurus) akashiensis* SHIKAMA, 1936.

Subgenus *Elaphuroides* OTSUKA, 1972

Type-species.—*Elaphurus (Elaphuroides) shikamai* OTSUKA

Geologic range.—Early Pleistocene (Middle to Upper Villafranchian).

The following two species are referred to the subgenus *Elaphuroides*:

E. (Elaphuroides) shikamai OTSUKA, 1968 and *E. (Elaphuroides) bifurcatus* TEILHARD and YOUNG, 1930.

Elaphurus (Elaphurus) tamaensis, n. sp.

(Pl. 1, figs. 1a–1b; Fig. 1)

Material.—A left incomplete skull with an antler attached (NSM 15308, holotype).

Locality and horizon.—The Hirayama Sand Bed, the lower part of the Minamitama Group, exposed on a floor of the Tama River. The site is situated about 36 meters west of a railway bridge of the Hachiko Line near Seisho Primary School, Akishima City, Tokyo.

Geologic age.—Probably Late Pliocene.

Specific diagnosis:—Elaphurine, having a large but slender antler with smooth surface. Forking-point is very high above burr. The burr is very thin, less rugose and circular in section. Beam below the first forking is very long and tabular. Posterior tine is also tabular in section and prolonged upper-backwards, making about an angle of 50 degrees with a line perpendicular to beam. The fore tine stretches upwards, or slightly declines forwards, making a continuation of the beam below the forking. In frontal view, antler and pedicles of opposite sides prolonged outwards, making an angle of about 65 degrees from each other.

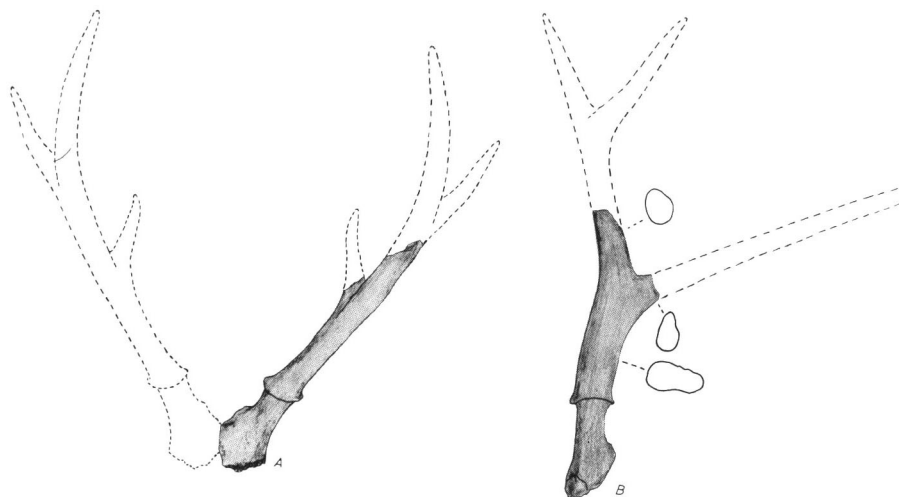


Fig. 1. Restored figures of antler of *Elaphurus tamaensis* n. sp. ($\times 0.1$)

Description of the specimen:—Lower half of the left antler with a small part of frontal bone is preserved. Pedicle is about 41.5 mm in length and 33.8 mm $\times$ 33.6 mm in minimum diameter. An angle of the pedicle diversion is about 65 degrees, if restored. Antler projects in the same direction as the pedicle in frontal view. Beam below the first fork is long, depressed laterally and shows nearly tabular outline with flat surface. The surface of the beam is very smooth but shallow and rather wide grooves are observable on the anterior surface. The ridge itself has small and less remarkable nodules on the surface.

Fore tine, which is forked at a very high point above burr, projects in the same direction as beam below the first fork, forming a continuation of the beam. It is nearly oval-shaped in section.

Posterior tine projects backwards, very slightly inner-upwards, making an angle of more than 70 degrees with the fore tine. Outline of the posterior tine shows iso-scales triangle at its base.

Measurements of antler (in mm):

Preserved length of the specimen. + 340

Length of pedicle along posterior border.....43.0
 Diameter of pedicle.....side-to-side: 33.8; fore-and-aft: 33.6
 Diameter of burr.....side-to-side: 50.0; fore-and-aft: 56.2
 Minimum diameter of beam below first fork....side-to-side: 26.2; fore-and-aft: 45.3

Comparisons and observations:—As already discussed by the senior author (OTSUKA, 1972), the genus *Elaphurus* is divided into two subgenera, *Elaphurus* and *Elaphuroides*. The latter includes two extinct species and its geologic range seems to be restricted to the Early Pleistocene (Middle- to Upper Villafranchian) of the north-eastern Asia. It is characterized by the antler in having a dichotomous forking of a fore tine and much lyrated beam with a terminal dichotomous forking. It shows closer relationship with Arde deer (*Arvernoceros ardei*) of Europe in their mode of the forking of the antler than any other living or fossil deer in the Old World. The former comprises three species and is mostly known from the ages younger than middle Pleistocene. Its antler is quite different from that of the latter in the straight posterior tine with many small prongs and straightly prolonged fore tine.

When the senior author (OTSUKA, 1972) established the new subgenus *Elaphuroides*, he regarded that subgenus *Elaphurus* was advanced probably from *Elaphuroides* after the Middle Pleistocene, because he could not find out a reasonable ancestral form of *Elaphurus* (s.s.) in the Early Pleistocene. Occurrence of the present new material belonging to the subgenus *Elaphurus* from the Minamitama Group, however, makes to change the previous opinions concerning the phylogeny of the genus *Elaphurus*. As discussed in the following, the present new species is regarded to an earliest representative of the subgenus *Elaphurus*, although the present specimen at hand is incomplete.

Posterior tine of the present specimen is completely broken off from its base and its cutting plane is very narrow and tabular in outline. Therefore, it seems to easily imagine that the posterior tine before the damage might have projected straightly backwards without dichotomous forking at terminal end as seen in the case of the subgenus *Elaphurus*. Furthermore, fore tine of the present specimen is rather stout, circular in section and declines forwards, so that it may be possible to suppose the fore tine forked at a terminal end as seen in the living Père David's deer (*E. davidianus*).

Judging from the characters mentioned above, the present new species apparently holds the characters of *Elaphurus* (s.s.). But in the other species of *Elaphurus* (s.s.) such as *E. davidianus* and *E. menziesianus*, the posterior tine stretches backwards, making a nearly right angles with the beam not forming a continuation of the beam and, the fore tine itself stretches upwards directly from the main beam below the forking without making any angle with the beam. From this point of view, the present new species somewhat differs from the species of *Elaphurus* (s.s.) and resembles *Elaphuroides*.

Cervus akashiensis was established by SHIKAMA (1941) based on a fragment of an antler from the Akashi Formation of the Ōsaka Group (lowest Pleistocene). At that time, he placed the species in the genus *Cervus* and distinguished it from *Sika*,

Nipponicervus (= *Depéretia*) and *Elaphurus*. The second specimen of this species was also recorded by him from the Late Pliocene portion of the Minamitama Group (SHIKAMA, 1964). Through the study on the second specimen, he changed its generic position to *Elaphurus*, paying his attention to the forking of the antler at the basal part. *E. tamaensis*, n. sp. is clearly discriminated from *E. akashiensis* in having less tuberculated surface of the beam, the different forking mode of the posterior tine and smaller size of the antler.

Although the senior writer (OTSUKA, 1972) assigned *E. akashiensis* to the subgenus *Elaphurus* according to SHIKAMA's opinion, a slight doubt is retained about such an assignment because the specimens of *E. akashiensis* are too incomplete to consider the precise systematic position. If *E. akashiensis* from the "Pliocene" Hirayama Sand Bed is not typical *Elaphurus*, therefore, *E. tamaensis*, n. sp. becomes an earliest representative of the subgenus *Elaphurus*.

References

- MILNE-EDWARDS, A., 1866. Note sur le Mi-lou, ou Sseu-pou-siang (*Elaphurus davidianus*), du nord de la Chine. *Ann. Sci. Nat., Zool.*, **5**: 380–382.
- OTSUKA, H., 1968. A new species of *Elaphurus* from the Akashi Formation in Hyogo Prefecture, Japan. *Rep. Fac. Sci. Kagoshima Univ.*, (1): 121–129, 1 pl.
- , 1972. *Elaphurus shikamai* OTSUKA (Pleistocene cervid) from the Akashi Formation of the Osaka Group, Japan, with special reference to the genus *Elaphurus*. *Bull. Natn. Sci. Mus.*, **15**(1): 197–210, 3 pls.
- OTSUKA, Y., 1932. Geology of Tama Hill. Pt. 1. *Jour. Geol. Soc. Japan*, **39** (469): 641–655. [In Japanese.]
- SHIKAMA, T., 1941. Fossil deer from Japan. *Jub. Pub. Comm. Prof. Yabe*, **2**: 1125–1170, pl. 52.
- , 1964. Cervid antler from the Akishima City, Tokyo. *Sci. Rep. Yokohama Nat. Univ.*, (2), **11**: 55–58, 1 pl.
- TAKAI, F., 1938. Cenozoic mammalian fauna of the Japanese Empire (A preliminary note). *Jour. Geol. Soc. Japan*, **45** (541): 745–763.
- TEILHARD de C., P. and C. YOUNG, 1930. Mammalian remains from Anyoung. *Pal. Sinica*, (C), **12** (1): 30–38, 2 pls.
- and J. PIVETEAU, 1930. Les mammifères de Nihowan (Chine). *Ann. Pal.*, (19), 16–18, 1 pl.
- TOKUNAGA, S., 1934. Fossil elephant teeth found at Yokohama and Kakio, Kanagawa Prefecture. *Jour. Geogr. Tokyo*, **46** (546): 363–371. [In Japanese.]

Explanation of Plate 1

Fig. 1. *Elaphurus tamaensis* n. sp.
Frontal (a) and lateral (b) views, $\times 0.6$.



