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Lipotes vexillifer.

By Robert L. Brownell, Jr., and Earl S. Herald

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Lipotes Miller, 1918

Lipotes Miller, 1918:2. Type species *Lipotes vexillifer* Miller, 1918, by original designation.

CONTEXT AND CONTENT. Order Cetacea, Family Platanistidae, Subfamily Iniinae. The genus *Lipotes* now includes one species *Lipotes vexillifer* as treated below. No subspecies are recognized.

Lipotes vexillifer Miller, 1918

White-flag Dolphin

Lipotes vexillifer Miller, 1918:2. Type locality "Tung Ting Lake, China."

DIAGNOSIS. Because *Lipotes* is monotypic, the following diagnosis applies to genus and species: general structure of skull as in *Inia* (Amazon River Dolphin) but rostrum curved upward (see Figure 1); proximal extremity of premaxillary thin and platelike, not forming raised anterior border to narial aperture; mandibular symphysis barely equal to free portion of ramus. Dentition (three specimens) ranges from 32 to 34 above and 31 to 34 below, essentially uniform throughout, with form of crown and character of enamel wrinkling (Figure 2) much as in median teeth of *Inia*, but root not thickened; entire tooth resembles that of Miocene North American *Schizodelphis* (modified from Miller, 1918). General external morphology also similar to *Inia*, but differs as follows: rostrum curved upward, pectorals relatively smaller and rounded rather than pointed, blowhole longitudinal and somewhat rectangular, and dorsal fin larger and triangular in shape.

GENERAL CHARACTERS. Longer descriptions that compare the skull and skeleton of *Lipotes* with those of *Inia* and the other two river dolphins, *Platanista* and *Pontoporia*, may be found in Miller (1918 and 1923), Slijper (1936), and Winge (1942). The "rugose enamel seems to characterize all known fossil and Recent iniid" dolphins (Kellogg, 1942).

Photographs of the holotype (skull and cervical vertebrae) and measurements appear in Miller (1918); for external black-and-white photographs, see Miller (1918), Pope (1940), and Figure 3; for schematic presentation of skull and skeleton, see Slijper (1936). The left tympanic bulla and periotic complex of *Lipotes* are shown in Figure 4. The color of the holotype was pale blue-gray above, white below (Miller, 1918).

External measurements were taken from the American Museum and British Museum carcasses before being prepared as skeletons. The measurements of the British Museum (Natural History) specimen are in parentheses and were converted from inches. All measurements of more than 100 mm were rounded to the nearest 5 mm. These have not been published previously and are given below: total length (tip of upper jaw to fluke notch) 2020 (2080); tip upper jaw to apex of melon (305), to angle of gape 375, to center of eye 440, to blowhole 495 (455), to posterior base of flipper 880, to anterior base of dorsal fin 1065; notch of fluke to anus 520, and to posterior base of dorsal fin 670; projection of lower jaw beyond upper 7; eye to angle of apex (direct) 85, and to center of blowhole (direct) 115; girth of head at eyes 750, girth of body just behind flipper 1010, maximum girth (1220), and girth just behind dorsal fin 820; length of eye 10; axilla of flipper to tip 210, maximum width of flipper 145; height of dorsal fin 100; width of flukes tip to tip 515, width right lobe 180; length of anal-genital slit 150; length between umbilicus and anterior margin of genital slit (455).

DISTRIBUTION. Found in Tung Lake, China, and around the mouths of, and up into, the various streams that flow into the lake (Hoy, 1923).

FOSSIL RECORD. No fossils are known for *Lipotes*. Rensberger (1969) described *Kampholophos serrulus*, a new genus and species of iniid dolphin, from the Miocene ("Monterey" Formation) of California (Alameda Creek, 8 mi. SE Sunol, Alameda County). Rensberger concluded that *Kampholophos* is as closely related to *Lipotes* as to *Inia* from the Amazon and Orinoco rivers of South America "in terms of the relative number of common characters." Considerable additional study is needed to clarify the relationships of these three genera.

FORM. Blubber thickness in the type specimen was approximately 38 mm over all of the body (Hoy, 1923). Relationships of tympanoperiotic bones to skull and air sinuses are given by Fraser and Purves (1960). A pair of large floating bones are found, one on each side of the blowhole on the anterior edge. These bones are thought to function with blowhole movements as each has a double retractor and protractor muscle (Hinton and Pycraft, 1922; Hinton, 1936). The vertebral count is relatively low: 7 cervical, 10 thoracic, 7–8 lumbar, and 19–20 caudal vertebrae with 12 chevron bones. The first six ribs have capitular and tubercular attachments. The blowhole air sacs were described by Hinton and Pycraft (1922) as was the ventriculus of the stomach, which is widely confluent with the second compartment, thus less completely segmented proximally than in most other genera. The asymmetry of body is excessive, with the right side overdeveloped (Hinton, 1936). Other organ systems have not been studied. Hinton (1936) reported that a study on the coarse anatomy of the British Museum *Lipotes* was under way and that a "complete photographic record of the work was made as it proceeded, and many preparations were preserved." F. C. Fraser (*in litt.*, 10 January 1969) stated that he was not aware of any preserved preparations from the specimen in the British Museum. Pope's unpublished field notes of 1921 stated: "All viscera as well as vaginal-anal opening and surrounding parts including teates saved. Also, pelvic rudiments; blowhole with surrounding flesh and underlying bones; and organs of throat." None of these materials could be found at the American Museum in December 1968.

REPRODUCTION. A lactating female, 2020 mm in total length, was captured on 21 December 1921. The type specimen, a male 2285 mm in total length, was said to be an adult (Miller, 1918). The British Museum specimen, a female, was 2080 mm in total length and was probably mature. Females are said to "breed" in the various streams that flow into the lake during the summer high water (Hoy, 1923).

ECOLOGY. No predators are known except possibly man. No ectoparasites or endoparasites are recorded (Dailey and Brownell, 1972). In summer, the water level in the lake rises and the dolphins are said to go up various streams that flow into the lake (Hoy, 1923). Pope's field notes revealed that two large scaled fish ("Lu-yu") were found in the stomach of his specimen; these had been recently eaten and measured 450 and 380 mm in length. The stomach of the type specimen contained 1.9 liters of a single species of a "long, eel-like catfish that inhabits the mud in the bottom of this lake" (Miller, 1918). Mud was stirred up and the water discolored where schools of *Lipotes* fed (Hoy, 1923). Dolphins are not seen in the clear part of the lake or far below its mouth (Hoy, 1923). The current status of the population of this species is unknown, but Pope (1940) stated that after getting the local fishermen to collect a specimen no others could be collected, and "one explanation of the failure of the fishermen to help further was that they hold the dolphin in awe, believing that ill fortune descends on those who molest it. The individual that they brought me may have been merely a compromise with fate; or perhaps they had been threatened by their guild."

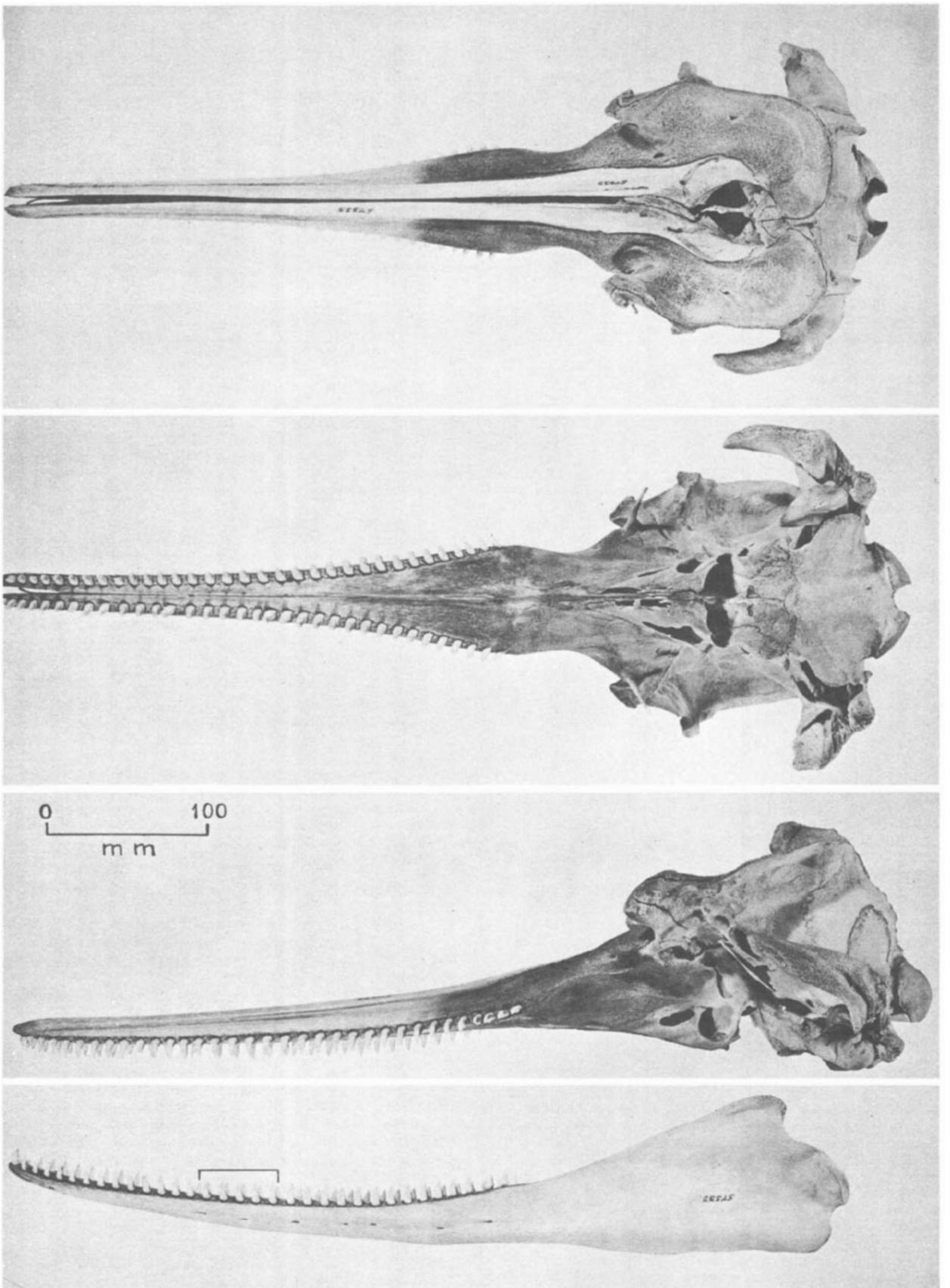

FIGURE 1. Photographs of skull and lower jaw of *Lipotes vexillifer*, AMNH 57333. From top to bottom, dorsal view, ventral view, lateral view of cranium and jaw (with area enlarged in Figure 2 marked).

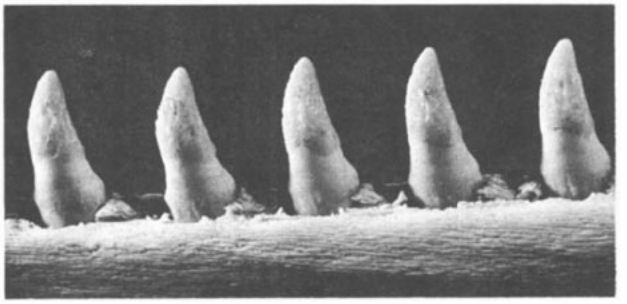

FIGURE 2. Lateral view of teeth 15 through 19 (counting from front to back) of left lower jaw of *Lipotes vexillifer* (see Figure 1).

BEHAVIOR. Group size is usually three or four, "but occasionally they may school in groups of 10 or 12 individuals" (Hoy, *in* Miller, 1918). Feeding is probably done around the bottom and perhaps in the mud. "The Chinese say that a peculiar roaring noise, that is often heard at night on the lake, is due to these dolphins, and judging from the noise that the one I secured made, this would probably seem to be the case" (Hoy, 1923). Hoy's specimen "when shot gave a cry like that of a water-buffalo calf."

REMARKS. A total of only five specimens (only one complete skeleton) appear to be extant in museums. The holotype (USNM 21893, skull and cervical vertebrae) was collected on 18 February 1916 by Charles M. Hoy (Hoy, 1923, stated that this specimen was collected in the winter of 1914, but a hand-written letter in the files of the U.S. National Museum from Hoy to Miller, dated 23 October 1917, stated that it was shot on 18 February 1916). AMNH 57333 (also catalogued under 63975), a complete skeleton, was collected on 21 December 1921 by Clifford H. Pope. BM(NH) 22–6–22–1, a once complete skeleton (all the ribs and all parts of the pectoral limbs, and pelvics are missing—P. E. Purves *in litt.*, 15 October 1970), was collected on 19 January 1922 by G. F. C. Corfield. The editor of the China Journal of Arts and Sciences reported at the end of Hoy's 1923 paper: "It is interesting to note that two specimens of this interesting dolphin lie in the Shanghai Museum (R. A. S.) and have apparently been there for some considerable time. One is a complete skull of an immature animal, the other the lower jaw of an adult. There is no data to be found in connection with these interesting specimens, which is regrettable." It was also noted that since Hoy secured the type specimen, "three specimens are reported to have been taken for the Third American [Museum] Expedition;" this was the expedition with which Andrews and Pope worked. Clifford Pope collected three dolphins in Tung Ting Lake, but two were black finless porpoise (*Neophocaena phocaenoides*). The third dolphin was the complete skeleton of *Lipotes* reported above.

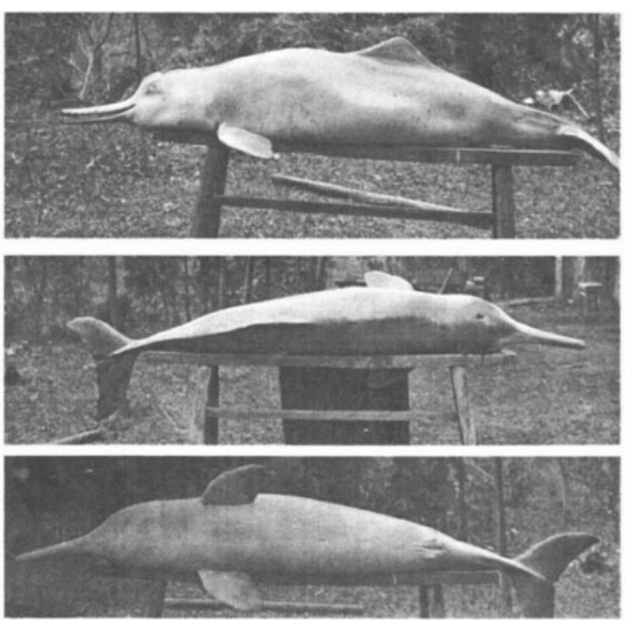

FIGURE 3. External views of the specimen of *Lipotes vexillifer* now in the American Museum. This specimen, a female, was 2.02 m in total length. Photographs by Clifford Pope.

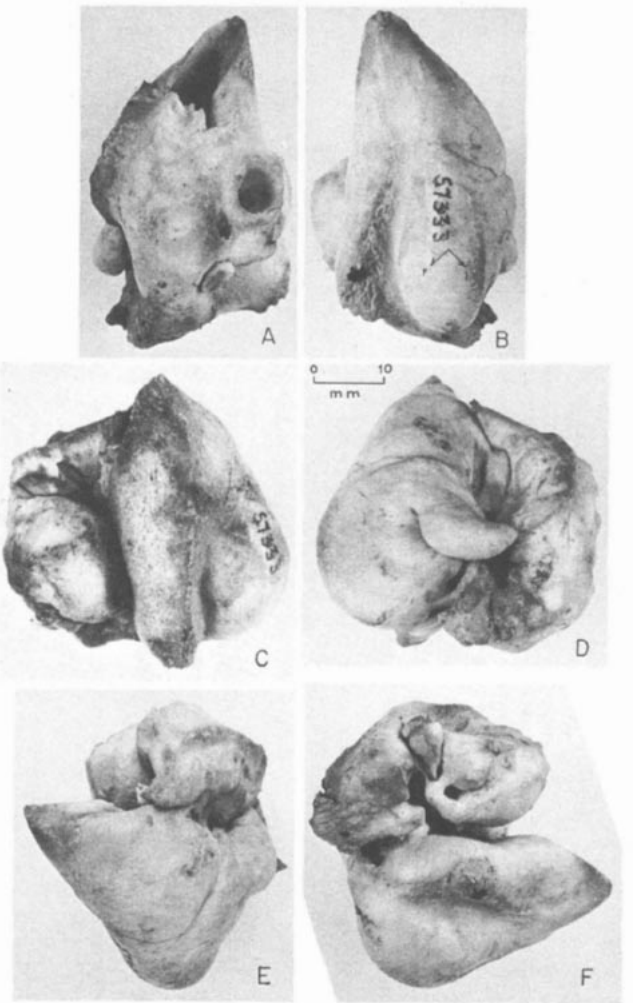

FIGURE 4. Fused left tympanic bulla and periotic complex of *Lipotes vexillifer* (AMNH 57333): A, dorsal view; B, ventral view; C, medial view; D, lateral view; E, anterior view; F, posterior view. These views are not precisely in the anatomical axes noted, but they are fairly close. In B, arrows indicate the posterior and lateral directions. The arrows intersect at the ventralmost point on the bulla. The anterior end is at the top in A, B, C, and D. In E and F, the dorsal surface is at the top. All skeletal and dental photographs (Figures 1, 2, 4) are by Mr. R. E. Logan, Department of Photography, The American Museum of Natural History.

Lipotes is from the Greek word *lipos* for fat and *tes* suffix for action and agency. The specific name *vexillifer* is from the Latin words *vexillum* for flag and the suffix *-fer* for carry or bear.

Nothing is known about the genetics or physiology of *Lipotes*.

Miller (1918) placed *Lipotes* in the family Iniidae, which also contains *Inia*. The Platanistidae (monotypic with *Platanista*) and Iniidae were recognized by Miller (1923) and Kellogg (1928). These authors transferred Stenodelphininae (monotypic with *Pontoporia*) from the Platanistidae to the family Delphinidae. Recent authors (Slijper, 1936; Simpson, 1945; Fraser and Purves, 1960) have placed *Inia*, *Lipotes*, *Platanista*, and *Pontoporia* together in the family Platanistidae. Simpson and the last two authors have recognized three distinct subfamilies. Slijper (1936) recognized no subfamilies. Publications dealing with fossil iniids (Kellogg, 1944 and

1955; Rensberger, 1969) have continued to recognize the iniids as a distinct family.

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The editor for this account was S. Anderson. Photographs are by the Department of Photography, The American Museum of Natural History, except Figure 3.

Robert L. Brownell, Jr., Research Collaborator, Department of Vertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D. C. 20560; and Earl S. Herald, Steinhart Aquarium, Golden Gate Park, San Francisco, California 94118.