Literatur

Brink, F. H. van den (1957): Die Säugetiere Europas westlich des 30. Längengrades. (Zoogdierengids van Europa ten westen van 30° oosterlengte, dt.). Übersetzt und bearbeitet von Th. Haltenorth. Berlin und Hamburg: Paul Parey.

Feldman, A.; Mitchell, O. G. (1968): The postnatal development of the pelage and ventral gland of the male gerbil. J. Morph. **125**, 303—314.

Jansen, V. (1968): The mongolian gerbil *(Meriones unguiculatus)*. J. Inst. Anim. Tech. **19**, 56—60.

Kramer, A. W. (1964): Body and organ weights and linear measurements of the adult mongolian gerbil. Anat. Rev. **150**, 343—348.

Marston, J. H.; Chang, M. C. (1965): The breeding, management and reproductive physiology of the mongolian gerbil *(Meriones unguiculatus)*. Laboratory Animal Care **15**, 34—48.

Nakai, K.; Nimura, M.; Shimizu, S.; Nishimura, H. (1960): Reproduction and postnatal development of the colony bred *Meriones unguiculatus kurauchii (mori)*. Bull. Exper. Anim. (Japan) **9**, 157—159.

Piechocki, R. (1969): Die Mäuseverwandten. In: Enzyklopädie des Tierreiches, Bd. **11**, Säugetiere II, von B. Grzimek. Zürich: Kindler.

Rich, S. T. (1968): The mongolian gerbil *(Meriones unguiculatus)* in research. Laboratory Animal Care **18**, 235—243.

— (1971): Selected bibliography on gerbillinae. Campus Veterinarian Division of Laboratory Animal Medicine, The Center for the Health Sciences, University of California, Los Angeles, California, 90024.

— (1972): Selected bibliography on gerbillinae. Campus Veterinarian, Division of Laboratory Animal Medicine, The Center for the Health Sciences, University of California, Los Angeles, California, 90024.

Schwentker, V. (1963): The gerbil. A new laboratory animal. Ill. Vet. **6**, 5—9.

— (1968): The mongolian gerbil. Ilar News **11**, 2—4.

Thompson, J. N.; Barret, St. D. (1969): Growth of the mongolian gerbil; *Meriones unguiculatus*. Trans. Kans. Acad. Sci. **72**, 223—229.

Walker, E. P. (1968): Mammals of the world, vol. II, 2nd ed. The Johns Hopkins Press, Baltimore.

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Notes concerning the freshwater dolphin *Inia geoffrensis* (de Blainville, 1817) in Venezuela

Pedro Trebbau and Peter J. H. van Bree

Eingang des Ms. 24. 3. 1973

Although the occurrence of *Inia geoffrensis* has been reported for Venezuela (Kellogg 1940; Cabrera 1961; Hershkovitz 1966), no detailed faunistic studies on the species in Venezuelan rivers have ever been published. The only papers we know of in which the dolphins from the Orinoco river system are mentioned, concern the

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rivers Meta (Olivares 1962) and Guaviare (Hershkovitz 1963; Mohr 1965), Columbian affluents of the Orinoco (see map).

In this article some preliminary notes are published on the occurrence of the species in Venezuela. Although we believe that the animals live in the Orinoco almost over its entire length and in all its large plains tributaries, we only mention the localities where specimens were actually observed or caught. Freshwater dolphins have been seen near Sacupana in the delta region of the Orinoco and upstream at Ciudad Bolivar, Calcara de Orinoco, and just below Puerto Ayacucho. In the northern and eastern affluents of the Orinoco, Inias were observed in the Apure River near San Fernando de Apure, in the Rio Portuguesa north of Guardarrama, in the Rio Guanare near Arismendi, on two localities in the Rio Guaritico and in the lower parts of the Rio Capanaparo and Rio Cinaruco; all these localities are indicated on the map by arrows.

We received unconfirmed reports about the occurrence of the species in the Rio Caura south of Maripa, and in the upper part of the Rio Orinoco (Territorio Amazonas) near the confluences of the smaller rivers Padamo and Mavaca. The last two records are doubtful as they could also concern the species of dolphin *Sotalia fluviatilis* (Gervais, 1853). If *Inia geoffrensis* is living in the upper Orinoco, they could be

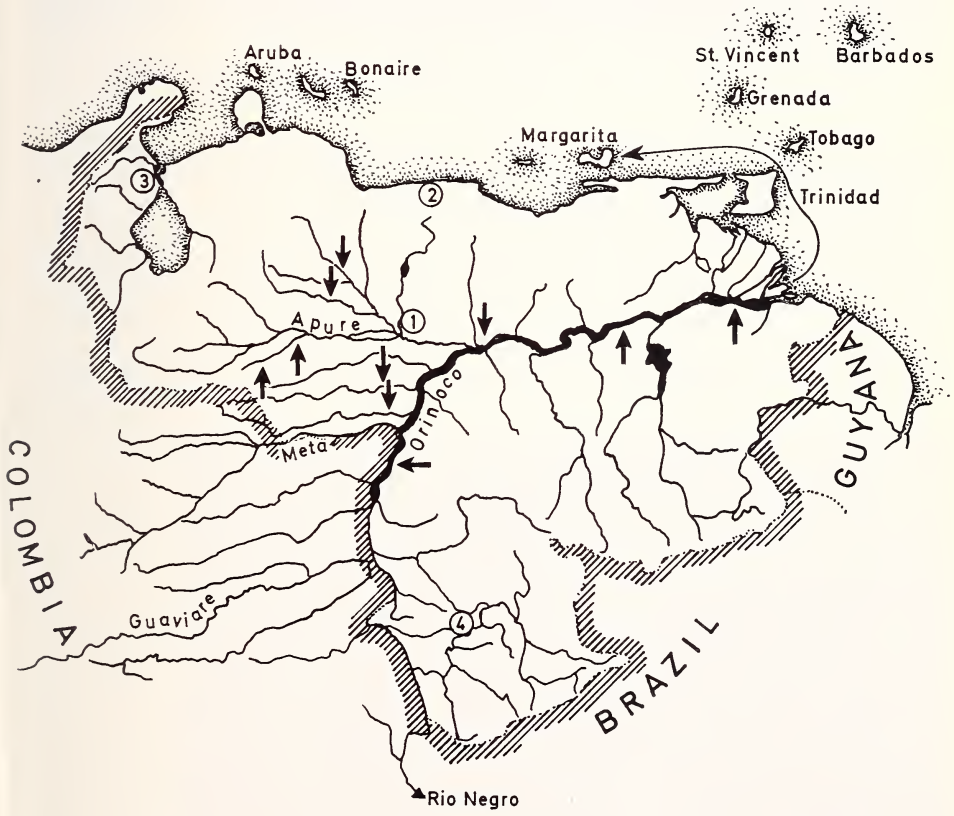

Fig. 1. Simplified map of Venezuela, showing the rivers and localities mentioned in the text: (1) San Fernando de Apure, (2) Caracas, (3) Maracaibo, (4) connection between the Orinoco and the Amazon River systems. The arrows indicate the places where *Inia geoffrensis* has been found

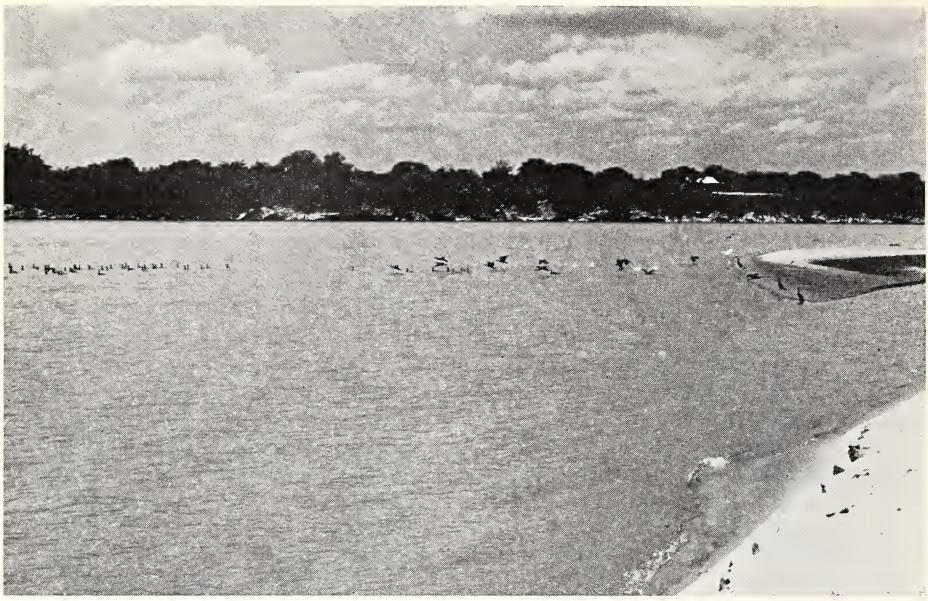

Fig. 2. Rio Apure near Fernando de Apure, Venezuela; one of the localities where *Inia geoffrensis* occurs

rather rare as the first author during a 15 day expedition between Ocamo and the origin of the Orinoco has not seen one specimen. Of course, after Platanal there are rapids which would block the river for dolphins.

In the collection of the Museo de Ciencias Naturales in Caracas is the lower jaw of an *Inia geoffrensis,* found by Mr. M. Grisol on Isla de Margarita. Assuming that no mistake has been made in relation to the origin of the piece, it seems probable that it pertains to an ill or dead specimen from the lower part of the Orinoco washed ashore on the mentioned island.

In Venezuela, *Inia geoffrensis* is generally living in brownish coloured, turbid and slowly streaming (fig. 2) or temporary stagnant waters. Apparently there are parts of the rivers with an abundance of fish, where Inias can be seen feeding in the same area for weeks. The first author has been able to observe them for more than an hour in the same place, surfacing about every 30 to 60 seconds. They mostly are encountered in small groups and seem to have a tendency to occupy a defined territory. The total number of individuals in a

Fig. 3. A small river during the dry season. During this season Inias often become trapped in those stagnant waters

group is difficult to establish as the water is always turbid.

In the dry season the water level in small rivers is lowered considerably so that lakes are formed by back waters (fig. 3). In these lakes Inias become trapped; most of these trapped Inias are young animals and perhaps they remained behind because of inexperience. Although the first author has observed some dolphins to be trapped in the same dry season lagoon for four consecutive years, he has no means of establishing whether they were always the same dolphins. Although these waters are very muddy, the animals appear quite healthy. Food is no problem as literally thousands of fish are also trapped, mostly catfishes and characids. It is not excluded that especially in these very muddy waters the bristlelike hairs on the snout play an important role in the search of food.

Fig. 4. External aspect of some adult specimens of *Inia geoffrensis* from the Rio Apure

According to observations of animals kept in captivity, fullgrown Inias eat about 4 to 5 kg fish each day. Two specimens sacrified for research immediately after capture had only the remains of fishes in their stomachs; two species could be identified, one belonging to the characid fish genus *Prochilodus*, the other species being the armoured catfish *Phractocephalus hemiliopterus*. These records concern Inias caught in the Apure river near San Fernando de Apure (see TREBBAU, in the press).

The colour variation in *Inia geoffrensis* in Venezuela is apparently related to age. All the juvenile specimens are a dark bluish metallic grey on the upper parts of the body, lightening to silver grey on the lateral and ventral regions. The older, larger Inias are much lighter in colour, the lateral and ventral parts being clear pinkish-

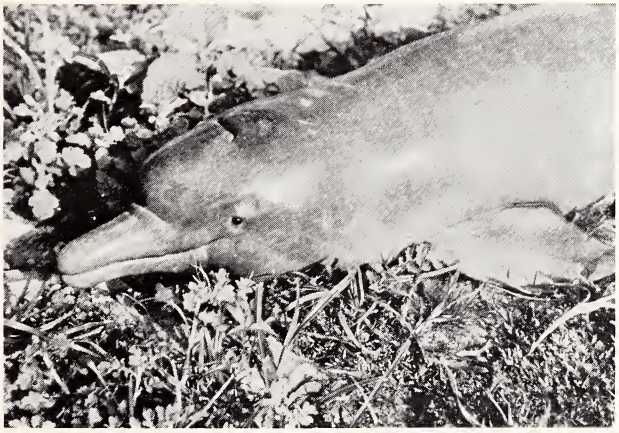

Fig. 5. Close-up of the head of a juvenile *Inia geoffrensis* from Venezuela

Dimensions in mm of four skulls and a lower jaw of *Inia geoffrensis* from Venezuela

The numbers between brackets are the measurements in percentages of the total lengths of the skulls

Collection and number	MBUCV 1-135	MCN b	MCN 251	MCN d	MCN e
Total length of skull	435 (100.0)	468 (100.0)	—	363 (100.0)	434 (100.0)
Rostrum length	267 (61.4)	304 (64.9)	—	218 (60.0)	268 (61.7)
Rostrum, basal width	84 (19.3)	96 (20.5)	—	70 (19.3)	80 (18.4)
Rostrum, width 60 mm anterior to base	41 (9.4)	53 (11.3)	—	32 (8.8)	32 (7.4)
Rostrum, width at its middle	25 (5.7)	32 (6.8)	—	21 (5.8)	23 (5.3)
Rostrum, width at 3/4 of its length	20 (4.6)	27 (5.8)	—	11 (3.0)	18 (4.1)
Least breadth between orbits	131 (30.1)	136 (29.0)	—	102 (28.1)	112 (25.8)
Breadth across pre-orbital angles of supraorbital processes	136 (30.3)	150 (32.0)	—	110 (30.3)	121 (27.9)
Breadth across post-orbital angles of supraorbital processes	171 (39.2)	180 (38.5)	—	136 (37.5)	153 (35.2)
Zygomatic width	207 (47.6)	214 (45.7)	—	166 (45.7)	196 (45.2)
Least width of braincase across parietals	104 (23.9)	90 (19.2)	—	80 (22.0)	86 (19.8)
Length temporal fossa	128 (29.4)	146 (31.2)	—	106 (29.2)	121 (27.9)
Height temporal fossa	77 (17.7)	78 (16.7)	—	64 (17.6)	76 (17.5)
Tip rostrum — nares	304 (69.9)	348 (74.3)	—	256 (70.5)	312 (71.9)
Length of upper toothrow (at right)	236 (54.2)	272 (58.1)	—	200 (55.1)	240 (55.3)
Length of upper toothrow (at left)	236 (54.2)	270 (57.7)	—	200 (55.1)	237 (54.6)
Tip rostrum — pterygoid	322 (74.0)	361 (77.1)	—	265 (73.0)	323 (74.4)
Number of alveoli (above)	25 — 25	25 — 25	—	25 — 26	24 — 25
Length mandible	373 (85.7)	—	398	311 (85.7)	374 (86.2)
Height mandible at coronoid	80 (18.4)	—	91	66 (18.2)	77 (17.7)
Symphysis mandibles (length)	180 (41.4)	—	199	141 (38.8)	183 (42.2)
Length lower toothrow (at right)	233 (53.6)	—	254	200 (55.1)	238 (54.8)
Length lower toothrow (at left)	233 (53.6)	—	255	200 (55.1)	237 (54.6)
Number of alveoli (below)	26 — 25	—	27 — 26	25 — 26	24 — 25

grey. There are no distinctive borders to the colours. The flukes and most of the snout are pinkish too. The melon is bluish with pink. The regions around the blowhole, eyes, neck and mid-dorsum are the darkest parts in the older dolphins, being bluish-grey. Nevertheless the general impression one gets is of a pink animal.

As compared to animals from the Amazon River system, it seems that specimens of *Inia geoffrensis* in Venezuela become less large when fullgrown. Although the

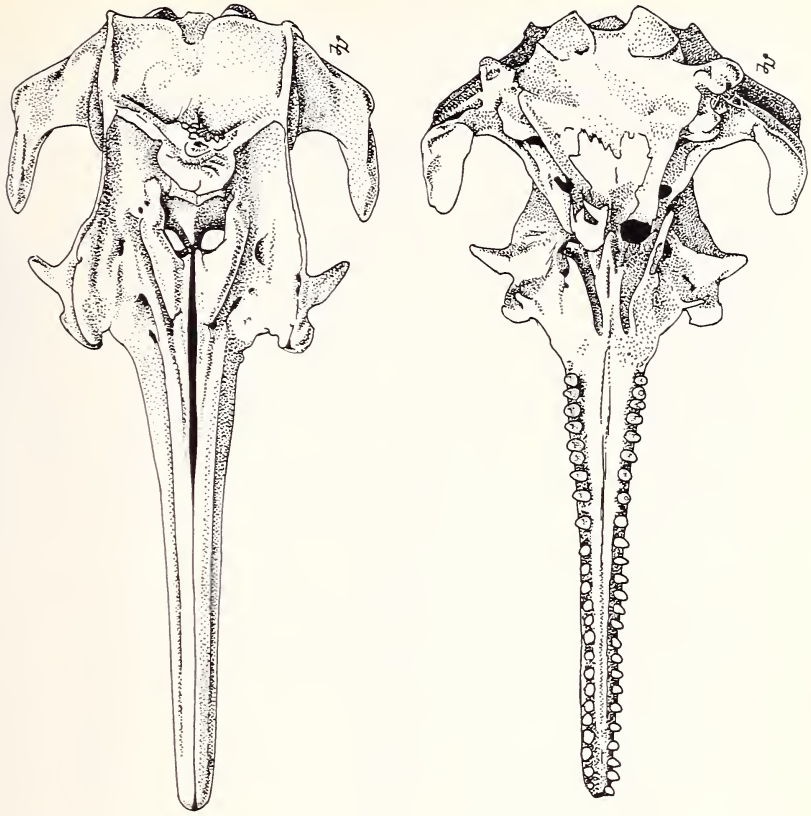

Fig. 6. Dorsal and ventral view of a calvarium of an *Inia geoffrensis* from the Rio Apure, near San Fernando de Apure (MCN # e); J. Zaagman fecit

number of data is still limited, it can be said that females with total lengths of 198, 202 and 208 cm were fullgrown, as well as males with total lengths of 208 and 228 cm. The female MUCV 1–135 (see also table) with a length of 198 cm was lactating when caught. In Delphinoidea the development of the supra-occipital crest is a useful age indication. In *Inia geoffrensis* the lateral crests formed by the latero-posterior parts of the maxillae and the frontals above the temporal fossae (see figures of the skull) can be used in the same way. Even in skulls of fullgrown specimens often some small foramina can be found in the supra-occipital above the foramen magnum. The number and location of those small foramina is subject to variation.

Caldwell (1966) in his preliminary report on the morphological variation in *Inia geoffrensis,* concludes that within the sole species a complex of as many as three subspecies may be recognized. From what we have seen of material from other areas, we share his opinion. Although the Amazon and Orinoco River systems are in contact with each other (see map), we do not know whether this anastomosis permits a steady exchange of genetic material. It is therefore conceivable that on theoretical grounds only the species must be divided into two subspecies. Awaiting the final results of the study by Caldwell, and in view of the paucity of our data, we refrain, however, from drawing conclusions concerning the taxonomic status of the freshwater dolphins in Venezuela.

The dimensions of some skulls of *Inia geoffrensis* caught in the Apure river near

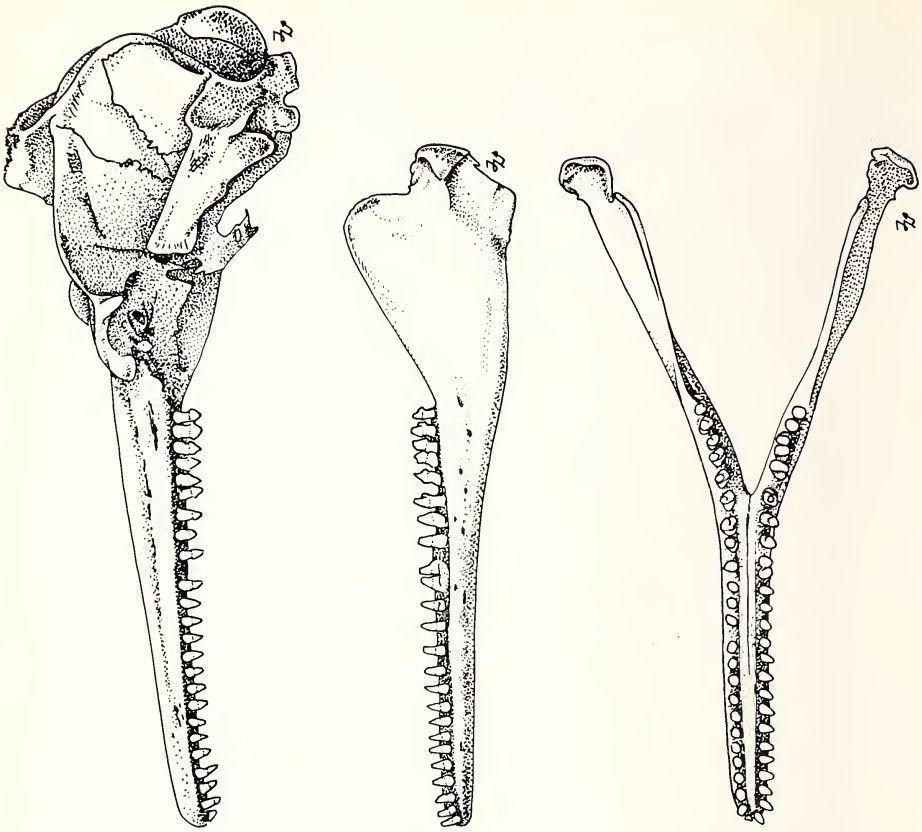

Fig. 7. Lateral view of a skull and dorsal view of the lower jaw of an *Inia geoffrensis* from the Rio Apure near San Fernando de Apur (MCN # e); J. Zaagman fecit

San Fernando de Apure (see map) are given in the table. The mandible MCN 521 is the one found on Isla de Margarita. The condylobasal length of the skull of that animal must have been about 466 mm. The external measurements of nine freshwater dolphins caught near San Fernando de Apure will be published by Trebbau (in press), together with notes on their behaviour in the wild and in captivity. The external aspect of some Inias caught in the Rio Apure is shown in figs. 4 and 5. As up till now only skulls of *Inia geoffrensis* from the Amazon River system are depicted in publications, we thought it useful to publish the drawings of a skull of a specimen from Venezuela (Rio Apure; MCN # e) made by Mr. J. Zaagman.

At the end of these preliminary notes we like to thank Dr. Inge Steinvorth de Goetz, Carlos Rivero and Hillary Branch for the help given. We also tender our thanks to the authorities of the Museo de Ciencias Naturales and the Instituto de Zoologia Tropical (Universidad Central de Venezuela), both at Caracas, for their cooperation. The second author gratefully acknowledges the grant received from the Netherlands Foundation for the Advancement of Tropical Research (WOTRO) to defray part of the costs of his stay in Venezuela and Surinam.

Summary

Preliminary notes are published on the occurrence and distribution of the freshwater dolphin *Inia geoffrensis* in Venezuela. Some data on their biology and the dimensions of some skulls are added.

Zusammenfassung

Notizen über den Süßwasser-Delphin Inia geoffrensis (de Blainville, 1817) in Venezuela

Über Auftreten und Verbreitung des Süßwasser-Delphins *Inia geoffrensis* in Venezuela werden vorläufige Angaben gemacht. Außerdem werden einige biologische Daten und Schädelmaße genannt.

References

Cabrera, A. (1961): Catalogo de los mamiferos de Americo del Sur; II. Rev. Mus. Argentino Cienc. nat. Rivadavia (Zool.) **4**, 309—732.
Caldwell, D. K. (1966): Morphological variation in the Amazon dolphin, *Inia geoffrensis* (Blainville). Yearb. Amer. phil. Soc. 328—331.
Hershkovitz, Ph. (1963): Notes on South American dolphins of the genera *Inia, Sotalia* and *Tursiops*. J. Mammalogy **44**, 98—103.
— (1966): Catalog of living whales. Bull. U. S. nation. Mus. 246, I—VIII, 1—259.
Kellogg, R. (1940): Whales, giants of the sea. Nat. geograph. Mag. **77**, 35—90.
Mohr, E. (1964): Notizen über den Flußdelphin *Inia geoffrensis* de Blainville, 1817. Zool. Garten 29, 262—270.
Olivares, A. (1962): Aves de la region sur de la Sierra de la Macarena, Meta, Columbia. Rev. Acad. Columbiana Cienc. Exact., Fis. Nat. 11, 305—344.
Trebbau, P. (in press): Measurements of and some observations on the freshwater dolphin *Inia geoffrensis* in the Apure River (Venezuela). Zool. Garten **46**.

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On the diagnosis of the South American dolphin *Sotalia fluviatilis* and its author

P. J. H. van Bree

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Some confusion exists concerning the first description of the species of dolphin *Sotalia fluviatilis* and its author(s). According to Cabrera (1961: 609) the valid diagnosis was published by Gervais as sole author in 1855. Cabrera *(loc. cit.)* regards the name *Delphinus fluviatilis* Gervais & Deville, 1853 as a *nomen nudum*. Hershkovitz (1966: 18), however, considers the 1853 description as valid and mentions as authors Gervais and Deville *in* Gervais (1853). He did not see the original description.

To avoid further differences of opinion it may be useful to cite completely the first description of the species. The more so as it was published in a rather obscure journal which can be consulted only in a few libraries. On page 148, Gervais wrote: "Les Delphinoïdes ou les Cétacés plus ou moins rapprochés du Dauphin ordinaire ont, comme les précédents, des représentants dans les différentes mers; mais ils sont plus nombreux qu'eux en espèces et, sauf quelques-uns, de moindres dimensions. Il y

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