



TAXONOMIC STATUS OF THE INDIAN SPECIES AND SUBSPECIES OF THE GENUS *CYNOPTERUS* F. CUVIER

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INTRODUCTION

The two species of the genus *Cynopterus* Cuvier viz. *Cynopterus sphinx* and *Cynopterus brachyotis* are known to occur in Indian Territory, and are widely distributed in different parts of the country. *Cynopterus sphinx* has one subspecies, the nominate one. The subspecies of *brachyotis* occurring in India are *angulatus*, *brachysoma*, *ceylonensis* and *scherzeri*, Ellerman & Morrison Scott (1966), however, Hill and Thonglongya (1972) found *angulatus* more similar to *sphinx* and regarded it as a subspecies of *sphinx* on the basis of its external and cranial measurements being closer to *sphinx*. All the measurements of different forms of *Cynopterus* occurring in India are so overlapping that it is difficult not only to distinguish the two species but also the measurements of different subspecies of both the species on the basis of which they have been separated, are also very much confusing and quite often one is confused for the other. Koopman (1989) also states that *brachyotis* and *sphinx* are usually confused. Hence, a detailed taxonomic study of different species and subspecies of the genus *Cynopterus* occurring in the Indian Territory has been made to overcome this problem and a large number of specimens from almost all parts of India has been examined for this purpose (Ghosh, M.K. 2005).

MATERIALS AND METHOD

The specimens of *Cynopterus* present in the National Zoological Collections, Zoological Survey Of India, Kolkata were utilized for studying the taxonomic status of its species and subspecies. In order to avoid any confusion only fully adult specimens were selected for this purpose. A total of about 700 specimens from 229 localities from all

over the country were examined. All the measurements taken are in millimeters. A detailed comparative study of the various measurements of the specimens of the above genus collected from different parts of India was made. The following is the list of various measurements with their symbols (in parenthesis) and definitions (Das, P.K. 2003):

Length of the forearm (Fa): The distance from the elbow to the wrist.

Length of the ear (E): The distance from the tip of the pinna to the notch at its base.

Length of the tibia (Tb): The distance from the knee-joint to the wrist.

Length of the foot and claw (F & Cl): The distance from the heel to the tip of longest toe with its claw.

Greatest length of the skull (l): Maximum length of the skull, measured from the hindermost point of the occipital surface in the middle line to the anterior most point of the premaxillary symphysis.

Condylbasal length (cb): The distance between the hindermost point of the occipital condyle of one side and anterior most point of the premaxilla of that side.

Length of cranial rostrum (cr): The distance from the front of the orbit of one side to the anterior extremity of the nasal bone of that side.

Length of maxillary tooth-row (mtr): The distance from the anterior surface of the crown of the upper canine of one side to the posterior surface of the crown of the last upper molar of that side.

Length of the lower tooth-row (ltr): The distance from the anterior surface of the crown of lower

canine of one side to the posterior surface of the crown of last lower molar of that side.

Mandibular length (ml): the distance between the hindermost point of the mandibular condyle to the anterior most point on the mandibular symphysis.

SYSTEMATIC ACCOUNTS

Class MAMMALIA

Order CHIROPTERA

Suborder MEGACHIROPTERA

Family PTEROPODIDAE

Genus *Cynopterus* F. Cuvier, 1824

1824. *Cynopterus* F. Cuvier, *Dents Mamm.* p.248.

Cynopterus sphinx sphinx (Vahl, 1797)

1797. *Vespertilio sphinx* Vahl. *Skr. Naturh-Selsk.* Copenhagen, 4: 123

(Tranquebar, Thanjavur district, Tamil Nadu, India).

Differential characters : Ears relatively longer, 18-20.5 mm. from orifice. Forearm 66-83 mm. (Andersen, 1912).

Cynopterus brachyotis Muller, 1838

1838. *Pachysoma brachyotis* Muller, *Tijdschr. Natuur. Gesch.* v. pt. i. p. 146. Borneo.

Differential characters : Ears relatively shorter, 13-18 mm. from orifice. Forearm smaller, 54.5-72 mm (Andersen, 1912).

Cynopterus brachyotis scherzeri Zelebor, 1869

1869. *Cynopterus marginatus* var. (*Pachysoma scherzeri*) Zelebor, *Reise Novara, saugeth*, 13. Car Nicobor, Nicobor Islands.

Differential characters : Ears averaging shorter and narrower. Length from orifice 13-15 mm, forearm 69.5-70.5 mm (Andersen, 1912).

Cynopterus brachyotis ceylonensis Gray, 1870

1870. *Cynopterus marginatus* var. *Ceylonensis* Gray, *Cat. Monkeys, Lemurs and Fruit-eating Bats.* B.M. 122. Sri Lanka.

Differential characters : Ears relatively larger, 15-17 mm, forearm 54.5-70 mm (Andersen, 1912).

Cynopterus brachyotis brachysoma Dobson, 1871

1871. *Cynopterus brachysoma* Dobson, *Proc. Asiat. Soc. Bengal*, 105. Andaman Islands, Bay of Bengal.

Differential characters : Forearm 59-66 mm, Ears 13-15 mm (Andersen, 1912).

Cynopterus brachyotis angulatus Miller, 1898

1898. *Cynopterus angulatus* Miller, *Proc. Acad. Nat. Sci. Philadelphia*, 316. Lower Thailand.

Differential characters : Forearm 65-72 mm, Ear 16-18 mm (Andersen, 1912).

RESULT

By comparing the measurements of huge number of specimens of *Cynopterus* collected from different parts of India and present in the collection of the Zoological Survey of India, it is obvious that measurements on the basis of which the two species i.e. *Cynopterus sphinx* and *Cynopterus brachyotis* have been separated are all overlapping and also the range of measurements of different subspecies of *Cynopterus brachyotis* i.e. *brachyotis ceylonensis*, *brachyotis brachysoma*, *brachyotis angulatus* and *brachyotis scherzeri* are not consistent and it is difficult to separate one from the other on the basis of the characters by which they have been separated such as length of forearm, ear, total length of skull, condylobasal length and length of cranial rostrum. Also no other significant difference is detectable in different forms of *Cynopterus* occurring in Indian territory. Therefore, all the Indian forms of *Cynopterus* are synonymized here with *Cynopterus sphinx sphinx*.

DISCUSSION

Andersen (1912) differentiated the two species of *Cynopterus* viz. *Cynopterus sphinx* and *Cynopterus brachyotis* on the basis of the length of ears as ranging from 18 mm to 20.5 mm and the length of forearm from 66-83 mm in the former Vs. length of ears ranging from 13 mm to 18 mm and forearm from 54.5-72 mm in the latter. He further mentioned that *Cynopterus sphinx sphinx* and *Cynopterus brachyotis angulatus* are very similar occurring together in Assam, Myanmar and Thailand, but distinguished them on the basis of longer cranial rostrum and larger ears in *sphinx*. Later on Hill and Thonglongya (1972) discussed the affinities of the *angulatus* and considered it to be a subspecies of *Cynopterus sphinx* rather than *Cynopterus brachyotis* with which it had been previously associated by the majority of authors. Koopman (1989) states that *brachyotis* is frequently confused with *sphinx*. Different forms of *brachyotis* occurring in Indian territory have been distinguished on the

TABLE

Comparative measurements of different forms of *Cynopterus* found in India viz. *Cynopterus sphinx sphinx* (*Cyn. s. s.*), *Cynopterus brachyotis angulatus* (*Cyn. b. a.*), *Cynopterus brachyotis scherzeri* (*Cyn. b.s.*), *Cynopterus brachyotis ceylonensis* (*Cyn. b.c.*), and *Cynopterus brachyotis brachysoma* (*Cyn. b.b.*):

	<i>Cyn. s.s.</i>	<i>Cyn. b.a.</i>	<i>Cyn. b.s.</i>	<i>Cyn. b.c.</i>	<i>Cyn. b.b.</i>
	627 specimens	34 specimens	16 specimens	33 specimens	10 specimens
	120 skulls	24 skulls	09 skulls	15 skulls	04 skulls
FA	58.8-84.5 (71.2)	63.2-72 (70.3)	58.4-73.8 (69.8)	63-70 (68.5)	68-72 (70.0)
Tb	18.8-32.9 (26.8)	22-27.5 (26.4)	23.2-28 (25.8)	19-28.6 (26.3)	21-27 (25.9)
E	15-24.4 (17.9)	14.5-18.9 (17.3)	15-18.8 (17.0)	13.0-19.0 (16.9)	13.0-17 (16.7)
F & CI	15.0-20.5 (17.4)	14.8-18.5 (16.8)	15.5-19.9 (17.2)	13-17.8 (16.6)	13.1-17.4 (16.5)
l	30.3-34.5 (32.8)	30.5-33.2 (32.5)	30.2-35.3 (33.0)	29.5-32.9 (31.6)	29.0-32.1 (30.8)
cb	27-30.6 (29.8)	29.5-32 (30.1)	27.2-30 (29.5)	26.5-29.9 (29.1)	27-29.8 (29.4)
cr	8.0-10.5 (9.2)	7.9-9.6 (8.9)	8.2-10.2 (9.3)	7.5-9.8 (8.8)	7.9-10 (9.0)
utr	10.5-12.5 (11.1)	10.2-11.3 (10.9)	10.7-12.0 (11.4)	9.9-11.2 (10.7)	10.2-11.0 (10.6)
ltr	11.3-14.0 (12.1)	11.1-13.2 (11.9)	11.2-12.0 (11.7)	11.0-12.2 (11.6)	11.1-12.1 (11.9)
ml	23.2-26.2 (24.6)	22.2-25.6 (24.2)	24.1-25.4 (24.0)	23.0-25.0 (23.9)	22.5-25.0 (23.8)

basis of very little difference in the size of their forearm and ear and are always confusing viz. forearm 65-72 mm, ear 16-18 mm in *angulatus*. Forearm 54.5-70 mm and ear 15-17 mm in *ceylonensis*; Forearm 59-60 mm and Ear 13-15 mm in *brachysoma* and Forearm 69.5-70 mm and Ear 13-155 mm in *scherzeri*. The relative size of total length of skull and cranial rostrum also do not show any significant difference as mentioned by Andersen (1912). The comparative measurements (Ghosh, M.K., 2005) of over 700 specimens (Table) show that there is no clear difference in different forms of the genus *Cynopterus* available in India. None of the characters based on which different forms of *Cynopterus* have been separated, holds good and are always confusing. Hence, the merger of all the species and subspecies of *Cynopterus* occurring in Indian Territory is the only solution.

SUMMARY

Indian species and subspecies of the genus *Cynopterus* have been studied in detail with special reference to the measurements on the basis of which they have been distinguished and it has been concluded that there is no significant difference between measurements of different forms of *Cynopterus* occurring in Indian territory and all the Indian forms are synonymized here with *Cynopterus sphinx sphinx*.

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