Rec. zool. Surv. India, **85**(3) : 391-402, 1988

A NEW SPECIES OF RAT-TAILED BATS (CHIROPTERA : RHINOPOMALIDAE) FROM IRAQ

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INTRODUCTION

The monotypic family Rhinopomatidae including the genus *Rhinopoma* contains only three species : *R. hardwickei* Gray, *R. microphyllum* Brünnich and *R. muscatellu*m Thomas. The last species was given full specific status recently (De Blasse et el, 1973). The genus is confined to Africa and south Asia. The species are easily separable. Corbet 1978, p. 39 ; Hill, 1977 and Harrison, 1964, PP. 53 & 58, have discussed their characters in detail. In Iraq, the genus appears to be curiously confined to some caves in small area of Western Iraqi desert particularly around the town of Haditha on the western bank of the Euphrates river. In the end of September, 1980, *R. hardwickei* and *R. microphyllum* were found inhabiting a small artificial cave but in the end of May, 1981 and subsequently the species under report was also detected in the same roost and in another cavern (a sinkhole), which was, however, not inhabited by the other two species of the genus referred to above. The species is named after the town of Haditha around which it is found.

I am much indebted to Dr. Munir K. Bunni, Director, Iraq Natural History Museum, Baghdad for provision of facilities and encouragement during the study and to Dr. H. J. Sakini for help in the collection of specimens. Sincere thanks are also due to the Officer-in-Charge mammal section,

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Zoological Survey of India, Calcutta for confirmation of the identity of the species,

Description : *Rhinopoma hadithaensis*, new species.

Holotype : Iraq Natural History Museum No. 83-566-Z8 Ad. male, Al-Fassayah cavern (a sink hole) about twenty km. from Haditha town on the left side of Haditha-Romadi Road 24th May to 2nd June, 1981, H. Khajuria Collector, Preserved in formalin and deposited in Iraq Natural History Museum, Baghdad.

Paratypes : ♂, 14 ; ♀ (pregnant/lactating), 12 : Al-Fassayah cavern (sink hole) about 20 km. from Haditha town on the left side of Haditha-Ramadi Road and an artificial cave in a hillock inside Haditha town, May-June, July, September, October, 1980-82, H. Khajuria Collector, collected with the help of INHM party.

Distribution : So far known from some caves around Haditha town, Romadi Governorate, Iraq.

Diagnosis : The new species can easily be distinguished from other three species by the following characters :

(i) Unforked and broader and longer posterior end of the baculum ; (ii) peculiarities of the male external genitalia with the anterior end of the penis converted into a sort of grasping organ ; (iii) distinctly large size of at least the adult males as compared with the subspecies of the most nearly related species, *R. hardwickei* found in the area (iv) generally paler colouration particularly on the ventral side ; and (v) enlarged triangular/quadrangular nasal inflations. From *R. microphyllum* it is further distinguished by its proportionately longer tail. A detailed description of the above characters is given below.

Description and comparison :*

Baculum : The baculum in four adults males examined is very peculiar. The posterior end is not forked as in *R. hardwickei* and *R. microphyllum* (Sinha, 1972, Khajuria, 1979)

* Illustrations of external genitalia are in Baghdad Museum and could not be obtained because of war but may be published later.

but shows a roundish or squarish single plate the dorsal surface of which is smooth but the ventral surface is uneven showing minute depressions. The anterior end of the baculun projects forward as a small process from the dorsal surface of the glans. The baculum and the external male genitalia of *R. murcatellum* do not appear to have been studied ; but the new species can be distinguished from this species by a number of other characters, which are more or less the same which distinguish *R. hardwickei* from *R. muscatcllum.*

External male genitalia : A typical condition is represen ted by a freshly killed adult male collected on 12th July (non-breeding season). The penis in this specimen is clearly distinguishable into three portions. A posterior much thicker, muscular, and paler half is abruptly marked off from the anterior much thinner half which is longitudinally striated, warty and blackish dorsally and is curved upward and then posteriorly. The posterior thicker portion is further longitudinally divided into a dorsal, transeversely ringed, vascular (reddish) and cyclindrical portion ending abruptly anteriorly in a circular, irregularly ridged truncated end and ventral thicker and whitish portion. The anterior ridged disc of dorsal cylindrical portion is in juxtaposition to the posterior curved tip of the penis forming a grasping structure somewhat comparable to the thumb and the index finger concavity of the human hand. It is possihle that this structure helps to grasp the posterior lip of the vulvar opening to facilitate copulation possibly because of the resting position of the female in which this opening is not well exposed. It may be noted that other three species of the genus also show a slight upward curvature of the tips of the penis but without any division of the organ into the parts described above except a few breeding specimens from India belonging to *R. hardwickei* but with very different type of baculum. In other two freshly killed males (which, I suspect to be yearling because of somewhat simpler external male genitalia and tooth wear and their collection with two yearling females considered to be so because they were neither pregnant nor lactating during the parturition season and had unworn

dentition, the penis shows the following characters. In one of the specimens, the dorsal cylinderical portion is indicated by the presence of reddish longitudinal area ending anteriorly in a tuberculated circular area. In the other specimen only the anterior tuberculated area is present. In both the specimens, the characteristic abrupt division of the penis into anterior upturned much thinner and dorsally warty portion and posterior much thicker portion is, however, clear. In still younger freshly killed two males, (fore arm, 59 to 60 mm) collected on 25th and 26th October about 4 months after parturition and may be the young of the year, dorsal cylinder cannot be made out clearly but the anterior portion of the penis show charactristic structure. It may be remarked that the above two specimens were the only ones which could be seen in the end of October. The rest of the colony has disappeared. In twelve males collected in the end of May when the females were in early stages of pregnancy and preserved in formalin for more than a year, the anterior end of the dorsal cylinderical portion either shows the same position as described in a freshly killed male or it is upturned possibly because of distortion of the tissue. Some whitish substance has, in some specimens, been noticed on this portion indicating its possible glandular nature. In the preserved material, it is also difficult to locate clearly the transverse rings on the dorsal cylinder or to detect its reddish tinge. The glans appears to be more or less of the same shape as *R. hardwickei* (Khajuria, 1979) but the penis shaft is bent upward. The blackish area around the preputal opening and between it and the anterior end of the dorsal cylindrical portion are well covered with wart like growth but with very scanty hair.

Nasal inflations: The nasal inflations are enlarged vertically and laterally but not as far forward as in *R. muscatellum* or as far backward as in *R. microphyllum*. It does not appear to be on record that in *R. microphyllum* these inflations extend much more backward than in either species so as to enclose a concavity between them. In *R. hardwickei*, they have been described as 'globular' (Hill,

1977). In the species under report, they appear as triangular, laterally and vertically enlarged areas with generally roundish anterior base but in older specimens (as in the Holotype) the base is angular so that from the dorsal view, they appear quadrangular. However, some overlapping with *R. hardwickei* is expected size. The measurements of the new species are given in table. I. The forearm, at least in adult males, which on the average appear to be larger than the female, is distinctly larger than that of the subspecies of *R. hardwickei, R. h. cystops* Thomas (now considered as *arabicum* by Hill, 1977) found in the area. The detailed measurements of several specimens of *R. h. cystops* found in Arabian peninsula are given by Harrison (1964). The only male definitely referable to *R. hardwickei* in this collection is at least a year old collected in June just before parturition. The forearm in this specimen (collected from area around Haditha town) is 53 mm and the penis is without the characters shown by males, including the yearlings, of the new species. Two freshy killed yearlings of the new species have the forearm 63.0 mm. It may be mentioned that all specimens (all age groups) of the new species so far collected from the type locality where the species occurs alone (not in association with the other two species) have the forearm 60 mm and above, except one young, *c.* 4 months old where it 58 mm. The maximum measurements recorded by Harrison (1964) for *R. h. cystops* are forearm, 59 and 59.3 mm (only two specimens in a sample of 81) and it is also possible that these specimens may not belong to *R. h. cystops.*

It may not be possible to separate all the females of the new species form those of *R. hardwickei* by forearm length and some overlapping may occur as in several other species ; but the specimens with forearm 60 mm and above can safely be referred to the new species. The measurements given by Harrison (1964) and Hill (1977) of *R. hardwickei* from Arabian peninsula and Africa reveal an extraordinary variation in forearm length showing a difference of about 16 mm between minimum and maximum measurements, the maximum measurement approaching 63 mm. It is very

difficult to explain such a variation in the forearm lengths of small insectivorous bats which acquire more or less the adult size soon after they start flying, unless the sucklings, easily distinguishable by their milk dentition, are also included. The present report satisfactorily explains this paradox by showing that larger specimens may belong to the new species if it has a wider distribution outside Iraq. All the age groups, except sucklings, of the new species show normal variation as shown by the measurements given in this report. It is, therefore, suggested that collections showing abnormal variation should thoroughly be examined at least for their external genitalia and bacular characters to ascertain whether they contain more than one species. A more careful examination of the collection made in the end of September, 1980, by me suggests the possibility that it may contain a few individuals of the new species. This collection does not appear to contain any adult male. There is one lactating female with farcarm 60 mm which can be referred to this species. Some specimens are young and some of these may also belong to this species. The fact that *R. h. cystops* does occur in the area is supported by highly experienced mammalogist, like Sanborn, Hatt and Harrison (Vide Hatt, 1959) and by this collection which contain at least one yearling male (referrrd to above) and at least three adult (pregnant) females forearm 54 to 56.7 mm. It appears that because of significant changes made in the roost leading to better exit facilities, the new species and *R. microphyllum* have now become dominant species.

Pelage and colouration : In freshly sacrificed specimens collected on 10th July, the fur is fine, close, and reach 20 mm in length. On the dorsal surface., the general colour in all specimens is whitish and almost white on ventral aspects. There are only two exceptions in a sample of 26 specimens where the ventral aspects are dirty white. Dorsally the tip of the hair is light brown, the base being white. There is a peculiar distribution of yellow colour. It is found on the ears including the tragus, the tip of which is ridged and more yellow, the bases of wing membranes, lower eye lids, corners

of the mouth, the throat, and posterior parts of abdomen, where fat is stored.

Habitat : The bat has so far been found in a sink hole located in the desert about 2 km from the river, and in an artificial cave excavated in a hillock inside Haditha town. The sink hole (Type locality) where the species is not found in association with other two species of the genus, is located about 20 km on the left side of Haditha-Romadi Road. It has somewhat semicircular opening at the level of of the ground aud about 25 m in diameter sinking slantingly about 50 m deep narrowing at places and with boulders strewn all over the floor. There are numerous cavities where bats can hide. Some water is reported to be present at the extreme end in some seasons. The cave gives out a peculiar smell. The species in question has been found suspended from the roof of the cave near the entrance. The second roost, the artificial cave, is being used partly for the storage of house-hold goods and partly as shelter for domesticated animals such as cows. The maximum dimensions are about 100m × 80m with maximum height of about 4m but the new bat has generally been found to occupy a small cavity about 8m in height near the entrance. The narrower entrance is on the main road and is divided into two parts by a thick hollow rocky partition. The wall and ceiling show a number of narrow cavities in which bats can hide. According to a party of Geological Survey of Iraq, the roof and the walls of the cave consist mainly of water bearing stalictate and staligmite. From a portion of ceiling, water drips and salts form small cones measuring upto about 15 cm in length. The bat usually occupies the hollow portion of the rocky partition of the entrance partly hidden from the view. The area to the east and the west of the cave present strikingly contrasting ecological conditions. On the east is the Euphrates with its fertile alluvial banks under perenial irrigation mainly growing date palms, plums, citrus and vegetables. On the west is the desert mainly containing Far series, Euphrates limestone and shelly dolomite with typical desert vegetation.

Breeding habits : Females collected on 30th May and 1st

June carried embryos with the maximum diameter of about 9 mm but very small embryos hardly visible to the naked eye were also found in some specimens indicating that conception period is spread over some weaks, possibly from the end of April to beginning of May. I, (Khajuria, 1972), observed mating in the allied species. *R. hardwickei* in February in central India. On 10th July, out of nine specimens collected, one was adult ♂, 2 yearling ♀, 2 lactating, 2 pregnant (foetus forearm 14.5-15 mm long) and two ♀ (not pregnant). This shows that it probably takes about 2 years to reach maturity. The parturition appears to be spread over a couple of weeks from the end of June to the middle of July.

Miscellaneous habits : The flight is fairly fast and fluttering at the level of, about tree tops. The bats start leaving the roost separately and fly towards the river. The bat has been observed to rest usually with its head and neck raised in line with its slanting back, while in *R. microphyllum* found in the same roost, the back is not usually slanting. Once on 6th July, the bats flew over the intruder and urinated. Sound resembles, *krin krin* but some low sounds were also heard when the bats were approaching mist net. The time of emergence on 10th July was 8.15 p.m. and that of return to the roost in the morning about 5.45 p.m. The bat returns to the roost singly. It could not be seen in the middle of February, air temperature at the roost entrance at 2. p.m. was 20-21.5°C and inside the roost 12°C to 19°C. In the end of October only two young were seen. In the type locality which is in the desert, it is very shy, immediately flying away with its usual sounds on the appearance of the intruder.

Fat deposits are present in the area of external genitalia in autumn and this probably makes the mating in this season, the usual mating season of bats in the area, difficult. Other mammal associates (collected) of this bat are *Hemiechinus auritus calligoni* Satunin, *R. m. microphyllum*, *R. hardwickei cystops*, *Asellia trideda murraiana* J. Anderson, *Myotis capaceini bureschi* Heinrich, *Miniopterus schreibersi pallidus* Thomas, *Pipistrellus kuhli ikhwanius* Cheesman and Hinton and *Eptesicus*

bottae Perers. *Canis aures* Linn. was seen and some domesticated animals also frequent the roost which is inside the town. Domesticated cats have been observed feeding on fallen young of some bats.

DISCUSSION

The monotypic family Rhinopomatidae recently reviewed by Hill (1977) does not show any fossil history at present. Some fossil bats do show long free tail and absence of bony calcar, important characrers of the family. The two species, *R. hardwickei* and *R. microphyllum* are the most widely distributed and have more or less the same distribution- They also occur sometime in the same cavities, but appear to remain somewhat separate as far as observed. The other two species, *R. muscatellum* and the new species appear to be the specialized representatives of *R. hardwickei* group as they show several important characters in common such as proportions of tail and forearm, vertical enlargement of nasal swellings with reduced posterior extensions, size, week cranial ridges, etc. The new species shows specialized male external genitalia and beculum, possibly an adaptation to the resting position of the female during copulation where the vulvar orifice is not well exposed.

It is interesting to note that there is a good possibility that all the four species of the genus *Rhinopoma* may be found in the same roost and that originally they were all considered as only one species, *R. microphyllum*. Later *R. hardwickei* was separated but again synonimized with *R. microphyllum* hy some workers. *R. muscatellum*, usually considered as subspecies of *R. hardwickei*, received full specific rank only recently (De Blasse *et al*, 1973). The new species appears to be also confused with *R. hardwickei* at least in some cases. This emphasizes the necessity of very careful examination of all specimens of bats found in large colonies as closely allied species may occur together because of shortage of specialized roosts as has been found in some other cases also.

TABLE—I

Measurement of R. hadithaensis, sp. nov.

Note : The abbreviations used in measurements are the same as used by Harrison (1964),

BODY

FA	T	HF	E	
		HOLOTYPE		
64.4	71.3	15.1	22.0	

The specimen is larger than others but the only one with good skull

PARATYPES

Males (adults and yearlings).

60.2	79.0	12.0	—	
62.1	71.0	13.0	17.9	
62.6	69.0	11.6	—	
60.4	65	10.7	—	
61.4	71.3	11.5	16.5	
61.2	72.0	13.2	19.3	
61.1	74.0 (+)	12.7	.7	
60.5	71.0	12.2	16.6	
62.5	74.0	12.9	18.2	
60.5	67.0	16.6	17.7	
60.2	68.0	12.0+	16.6	
62.0	71.0	14.0	21	(freshly killed)
63.0	65.0	13 0	20	—do—
60.7	67.0	13.5	21.5	—do—
60.0	65.0	12.1	16.0	
62.0	67.0	12.5	19.0	
60.0	61.0	11.9	18.0	

Note : There are 8 lactating females collected in September, with FA 60.2-62

Skull

GTL	CBL	ZB	BB	IC	CM^3	$C\text{-}M_3$	M
			HOLOTYPE				
19.2	—	12.0	10.2	4.2	8.2	8.5	14.2

PARATYPES

♂

17.7	17.1	10.5	8.6	2.2	6.1	6.7	12.
18.4	17.0		8.1	1.9	6.2	6.2	13.0
17.1	46.5	10.8	7.7	8.4	6.2	6.7	12.
17.8	—	10.2	8.2	2.4	6.0	6,8	11
18.3	17.2	10.9	8.3	2.4	6.1	6.0	12.0
17.9	17.5(—)	11.1	7.7	2.3	6.5	6.8	12.0
17.8	16.6	—	8.2	2.8	6.2	6.5	12.0
17.9	16.4	11.1	8.2	2.7(—)	6.2	6.1	12
17.7	16.7	10.3	7.9	2.1	5.4		
17.5	16.5	10.4	8.0	2.0	6.1	6.4	11.9

♀

17.2	15.8	10.2	7.9	2.4	5.9	6.5	11
17.2	15.8	—	7.7	2.2	5.8	6 1	11
17.1(+)	16.6(—)	10.5	8.0	2.5	5.9	6.6	12
16.5	16.5	9.8	7.6	1.9	6.0	6.6	11
17.2	16.3	10.7	7.8	1.8	6.0	6.4	11.5
17.0	15.7	10.0	7.8	1.8	5.8	6.0	11.5
18.1	16.6	11.3	8.2	2.5	6.2	6.6	12.7

SUMMARY

A new species of rat-tailed bats, *Rhinopoma hadithaensis* is described from the Iraqi western desert. It is, easily distinguished from the other three species of the genus by the characters of the baculum, external male genetalia, size, colouration and to some extent by the form of nasal inflations.

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