

**RECENT RECORD OF DESERT YELLOW HOUSE BAT, *SCOTOECUS PALLIDUS*
(ORDER CHIROPTERA) FROM PUNJAB, PAKISTAN**

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ABSTRACT

The desert yellow house bat, *Scotoecus pallidus* is an endemic species of Indian sub-continent with type locality Mian Mir, Lahore, During present study 36 specimens of *S. pallidus* were captured from Gujranwala, Mandi Bhauddin and Hafizabad districts of Punjab, Pakistan The morphological features, external body, cranial and bacular measurements of captured specimens were compared with available literature. Average head and body length of all the captured specimens (n = 36) of *S. pallidus* was 55.9 mm, average forearm length was 37.0 mm, greatest skull length (n = 5) was 14.8 mm while average baculum length (n = 3) was 5.0 mm. Bacular features of the species are reported for the first time in country.

Key words: Cranial measurements; baculum size; agro-ecosystem; Punjab.

INTRODUCTION

The chiropteran diversity of Pakistan is comparable to any other region with similar physiographic features. The bats constitute 28% of mammalian fauna of Pakistan, however, are amongst the least studied taxa (Roberts, 1997; Mahmood-ul-Hassan *et al.*, 2009) regarding their occurrence and distribution in the country (Roberts, 1997; Bates and Harrison, 1997). Information about most of the bat species is based on original description as the species has not been collected subsequently (Mahmood-ul-Hassan *et al.*, 2009). So far 54 chiropteran species have been documented from Pakistan and number is expected to increase if cryptic bat species are accurately identified (Walker and Moller, 2004; Mahmood-ul-Hassan *et al.*, 2009). Bats are only mammals capable of true flight and can cross the barriers that other mammals cannot do (Wilson and Reeder, 1993; Hutson *et al.*, 2001). Feeding habits of bats range from primary consumers (seed, pollen, leaf or fruit eaters) to top order predators (insects, fish and small mammal eaters) (Beolens *et al.*, 2009).

Scotoecus is largely an African genus with distribution range from Senegal to Ethiopia, south to Angola and Mozambique (Hill, 1974). Single Asian species *Scotoecus pallidus* is endemic to Indian subcontinent (Sinha, 1986) and has been reported from India and Pakistan (Koopman, 1993; Roberts, 1997) which may have distribution in northern India through Uttar Pradesh and Bihar (Corbet and Hill, 1992). In Pakistan, *S. pallidus* was first collected by Dobson from Mian Mir near Lahore in 1876. The species has wide spread distribution in Indus plains of Pakistan and has

been reported from Kashmore, Mirpur, Naundero (Wroughton, 1916), Sukker and Dadu in Sindh province (Siddiqi, 1961), and Muzaffargarh and Sialkot in the Punjab province. *Scotoecus pallidus* seems to be an uncommon bat and no specimen has been collected from Lahore District after 1876 (Roberts, 1997).

Scotoecus pallidus Dobson, 1876 is a relatively small vespertilionid bat with an average forearm length of 36.2 mm (Bates and Harrison, 1997). The species prefers to live in tropical thorn forests (Siddiqi, 1961). However, nothing is known about species' habitat and population status in the Indian subcontinent (Molur *et al.*, 2002). Survival of *S. pallidus* is at risk and the major threats include urbanization, loss of habitat and competition from invasive alien species (Molur *et al.*, 2002). This grieved situation demands long term monitoring and research on these environment friendly creatures (Meyer *et al.*, 2010). The present work was, therefore, planned to explore three main rice producing districts of Punjab, Pakistan to ascertain the presence or absence of *S. pallidus*.

MATERIALS AND METHODS

This two years study extending from January 2011 through December 2012 was carried out in three districts namely Gujranwala, Hafizabad and Mandi Bhaudin of the central Punjab. These districts comprise core rice producing belt of the country, are densely populated and the entire natural ecosystem has been changed in to agro-ecosystems and human habitations. These districts experience cold winters and warm summers. Temperature fluctuates between minimum up to freezing point during winters to 50 °C during summer

season. Annual rainfall is 650 mm but rains are more frequent in monsoon (Qadir *et al.*, 2008; Ullah *et al.*, 2009).

Each district was surveyed on monthly basis and mist nets and hand nets were used to collect bat specimens. Old buildings, abandoned wells, ruins, houses, tree groves and plantations were explored in search of bat roosts. People of the study area were also interviewed to get information about exact locality of bats.

Character matrices and identification keys are authentic tools for accurate identification of different bat species (Srinivasulu *et al.*, 2010). Taxonomic status of many of the bat species is unclear in Pakistan and there is dire need to identify bats on the basis of physical features. Roberts (1997) and Bates and Harrison (1997) are only source of literature on bats of the region.

Once the specimens were captured, they were euthanized, placed in cotton bat bags, each specimen was weighed up to 0.1 g (Pesola balance 10050, Swiss made) and brought to the laboratory for further analysis. The external body measurements were taken using a digital vernier caliper (0-150 mm) following Bates and Harrison (1997). For cranial and bacular measurements, the skulls and bacula were prepared and measured following Bates *et al.* (2005) and Javid (2011).

RESULTS AND DISCUSSION

During present study, 36 *Scotoecus pallidus* were captured and external body, cranial and bacular features of these specimens were compared with Roberts (1997) and Bates and Harrison (1997), the only authentic sources on bats of the region. These specimens were captured from Rasul nagar (73°46.720 E, 32°19.68 N) and Verpal chattha (73°58.803 E, 32° 10.803 N) villages in Gujranwala district, and Kaleki mandi (73°42.697 E, 32°04.150 N) and Jalal pur bhattian village (73°22.51 E, 32°02.390 N) in Hafizabad district.

The dorsal fur of the captured specimens was pale brown with greyish white ventral surface. The ears, wings and interfemoral membrane were brown. The nostrils were circular, muzzle was broad and flat, the ears were of moderate size with rounded tips while the tragus was narrow and long. The calcar was well developed.

Our findings are in line with Bates and Harrison (1997) and Roberts (1997).

Average head and body length of all the 36 specimens captured during present study was 55.9 mm, forearm length was 37.0 mm, hind foot length was 9.5 mm and the tail was 33.2 mm long while according to Roberts (1997), the average head and body length, forearm length, hind foot length and tail length was 54 mm, 36.2 mm, 8.0 mm and 37.0 mm, respectively. All these measurements fall within the ranges given by Roberts (1997) and Bates and Harrison (1997). Similarly, average ear length, length of 3rd metacarpal, length of 4th metacarpal and length of 5th metacarpal recorded during present study were 11.2 mm, 35.2 mm, 34.7 mm and 34.3 mm, respectively. Bates and Harrison (1997) recorded average ear length 12.8 mm, length of 3rd metacarpal 34.6 mm, 34.2 mm and 33.7 mm. All these measurements, except ear length, which is slightly smaller fall within the ranges given by Bates and Harrison (1997).

The upper surface of skull of the captured specimens was broader and there was only one pair of incisors in the upper jaw. These features are in line with the findings of Roberts (1997). Average breadth of braincase of 5 *S. pallidus* captured during present study was 7.2 mm, zygomatic breadth was 10.1 mm, postorbital constriction 4.3 mm, condylo-canine length 14.3 mm, greatest length of skull 14.8 mm, maxillary tooththrow length 4.9 mm, anterior palatal width 4.5 mm, posterior palatal width 6.0 mm, mandibular tooththrow length 5.4 mm and mandible length was 10.8 mm. According to Bates and Harrison (1997), average breadth of braincase of *S. pallidus* was 7.7 mm, zygomatic breadth 10.5 mm, postorbital constriction 4.7 mm, condyle-canine length 14.1 mm, greatest length of skull 15.1 mm, maxillary tooththrow length 5.6 mm, posterior palatal width 6.9 mm, mandibular tooththrow length 6.1 mm and mandible length was 11.4 mm (Table 1). All these measurements are comparable while average breadth of braincase, mandibular tooththrow length and mandible length of five *S. pallidus* were within the ranges mentioned by Bates and Harrison (1997).

Average total length of baculum (n = 3) of *S. pallidus* captured during present study was 4.9 mm, the shaft was 4.1 mm long while the height of baculum was 0.5 mm. The bacular features of the species are reported for the first time in country.

Table 1. Comparison of external body, cranial and bacular measurements of *Scotoecus pallidus* captured during present study with Roberts (1997) and Bates and Harrison (1997).

External body features	Present study (n = 36)	Roberts (1997)	Bates and Harrison (1997)	Cranial measurements	Present study (n = 5)	Bates and Harrison (1997)
Body mass	11.5 (9-14.3)	-	-	Breadth of braincase	7.2(6.4-8.0)	7.7(7.5-8.2)
Head and body length	55.9 (47-59)	54(50-59)	52.8(50-58)	Zygomatic breadth	10.1(9.8-10.4)	10.5(10.5-10.5)
Ear length	11.2(9-13.5)	-	12.8(12-15)	Postorbital constriction	4.3 (3.9-4.8)	4.7(4.2-4.5)
Tragus length	4.2(3.4-4.8)	-	-	Condylar-canine length	14.3(13.7-15.2)	14.1 (13.8-14.8)
Thumb length	6.3(5.2-7.5)	-	-	Greatest length of skull	14.8(14.3-15.2)	15.1 (14.5-16.1)
Claw length	2.2(2-4.5)	-	-	Maxillary tooth row	4.9(4.2-5.5)	5.6 (5.5-5.9)
Forearm length	37(34-39.5)	36.2(34.1-37.3)	36.2(34.1-37.3)	Anterior palatal breadth	4.5(4.2-4.7)	-
3 rd metacarpal length	35.2(34-39)	-	34.6(33.5-36)	Posterior palatal breadth	6.0(5.3-6.4)	6.9(6.6-7.2)
3 rd metacarpal: 1 st phalanx	12(7-13)	-	-	Mandibular tooth row	5.4(4.8-5.7)	6.1(5.9- 6.4)
3 rd metacarpal: 2 nd phalanx	10.(6.1-11)	-	-	Mandible length	10.8 (10.3-11.2)	11.4(10.9-12)
4 th metacarpal length	34.7(31-38.5)	-	34.2(32.8-35.4)	Bacular Measurements	(n = 3)	-
4 th metacarpal: 1 st phalanx	11.3(10.2-12.5)	-	-	Total length of baculum	4.9 (4.7-5.2)	-
4 th metacarpal: 2 nd phalanx	8.98(7-10.7)	-	-	Length of shaft	4.1(3.6-4.7)	-
5 th metacarpal length	34.3(33.2-35.4)	-	33.7(32.6-34.9)	Length of proximal Branch	0.5(0.46-0.7)	-
5 th metacarpal: 1 st phalanx	9.3(5.8-11.5)	-	-	Length of distal branch	0.4(0.34-0.4)	-
Wing span	25(21.6-32.8)	-	-	Width of Proximal branch	1.2(0.8-1.7)	-
Tibia length	13.3(8.5-15)	-	-	Width of distal branch	0.5(0.47-0.53)	-
Calcaneal length	5.7 (3.5-8)	-	-	Height of Baculum	0.5(0.4-0.6)	-
Hind foot length	9.5(7.5-11)	8.0	8.3(6-10)	-	-	-
Tail length	33.2(27.2-38)	37(31-41)	36.9(34-41)	-	-	-

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