Journal on New Biological Reports **1**(2): 47-60 (2012) **ISSN 2319 – 1104 (Online)**

New Record and Extension of North-Eastern Range of Endemic Bengal Mongoose *Herpestes palustris* Ghose, 1965 in southern West Bengal, India

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(Received on: 2 November, 2012; accepted on: 25 November, 2012)

ABSTRACT

The Bengal Mongoose *Herpestes palustris* Ghose, 1965 (Mammalia: Carnivora: Herpestidae) is endemic to the peri-urban and non-forest inland freshwater wetlands in southern West Bengal, Eastern India. Up to April 2011, its occurrence has been reported from twenty-two fragmented ecological niches- 3 in Howrah, 9 in North 24-Parganas (including 125 km^2 East Kolkata Wetlands) and ten in South 24-Parganas districts. Considering that this rare species might survive in the yet-to-be-surveyed habitats, a field survey was conducted during October 2011–September 2012 in the selected wetlands of Barasat town and surroundings, North 24-Parganas. While monitoring, sighting records and photographic evidences of a resident family were collected from an old and undisturbed garden house fringed by a receding native wetland (0.66 acre) named 'Ghosh *pukur*' (22°43´38˝°N, 88°28´48˝°E), 15 km east of erstwhile Sukhchar habitat (22.43°N, 88.22°E), substantiating extension of the north-eastern range of *H. palustris*. The mongooses use this microhabitat for diurnal foraging and shelter.

Key words: survey, freshwater wetlands, new record, resident family

INTRODUCTION

The taxonomic status of Bengal or Indian Marsh Mongoose *Herpestes* (meaning 'creeping thief' indicating its typical posture) *palustris* (meaning 'swampy' or 'marshy' habitat) Ghose, 1965 (Mammalia: Carnivora: Herpestidae) remains controversial. Before discovery during the course of a longitudinal (1960s) bird and mammal survey of the Salt Lakes in the eastern fringe of Kolkata (northern part of the Sundarbans up to early twentieth century, later reclaimed and renamed Bidhannagar) by the scientists of Zoological Survey of India (ZSI), the Bengal Mongoose was considered a subspecies of the Small Asian Mongoose *H. javanicus* É. Geoffroy Saint-Hilaire, 1818. Some sources also considered it conspecific with the Small Indian Mongoose *H. auropunctatus* Hodgson, 1836, which is naively similar to but separated from *H. palustris* on the basis of skin and skull of an adult male (Ghose 1965). But there has been no credible refutation of the species status of Bengal Mongoose (Mallick 2011). Microscopic analysis of structure (banding pattern, scale count, scale pattern, scale margin, medullary configuration and index) of the dorsal guard hair samples of five Indian species of the genus *Herpestes* by the scientists of ZSI also supports that *H. palustris* is a distinct species (De *et al.* 1998).

Ghose (1965) placed *H. palustris* in the family Viverridae (Gray, 1821), inasmuch as they descended from the viverravines and have the same basic dental formula as the viverrids. But both morphological and molecular evidences speak against the monophyly of this group and they also have characteristic behavioural features that distinguish them from the viverrids and other feliformian families. Accordingly, the mongooses were reclassified into the family Herpestidae (Bonaparte, 1845).

Ghose (1965) observed that *H. palustris* is distinguishable by a black patch on the muzzle (also found in three mongoose species of different habitats- the Stripe-necked Mongoose *H. vitticollis* Bennett, 1835 from south-west India and Sri Lanka, *H. siamensis* Kloss, 1917 from North Thailand and *H. rubifrons* Allen, 1909 from Hainan, southern China), rough and coarsely grizzled coat, obnoxious odour (like the Crab-eating Mongoose *H. urva* Hodgson, 1836), typical ecological niche (non-saline wetlands

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and mud-banks near the water's edge), two-phase natural foraging (early morning and late afternoon) to avoid high mid-day temperature, food specialization (small fish and aquatic invertebrates), semi-aquatic hunting, and apparent absence of hybridization with other Herpestids found in the region.

Presence of *H. palustris* is conspicuous to a tiny range restricted to Howrah, South and North 24-Parganas districts. No record of its occurrence is available from other districts of southern West Bengal or elsewhere. Out of five major systems of wetlands and deepwater habitats- marine, estuarine, lacustrine, riverine and palustrine, Bengal Mongoose is the only species of the genus *Herpestes,* which is endemic to only the palustrine ecosystem (the specific epithet referring to its typical habitat) of India or, more precisely, southern West Bengal. Its ecological niche is distinct from other two regional mongoose species, e.g. Small Indian Mongoose *H. auropunctatus* and Grey Mongoose *H. edwardsii* E. Geoffroy Saint-Hilaire, 1818 (Mallick 2011), inasmuch as the Bengal Mongoose is a permanent resident of only the inland freshwater marshes (not salt marshes or forested coastal swamps because no such record of its occurrence is available from the 9,600 km^2 brackish habitat in Indian Sundarbans, 100 km to the south-east of Kolkata).

BACKGROUND AND OBJECTIVES TO THE STUDY

Only two studies were conducted by ZSI in 1960s on the new species *H. palustris*- one in N. 24-Parganas and Howrah (Ghose 1965) and another in S. 24-Parganas (Ghose & Chaturvedi 1972). Thereafter no species-specific study was undertaken in the region up to 2004. As a result, the species has remained a poorly known and data deficient species [Nature, Environment and Wildlife Society (NEWS) *in litt*. 2006]. Deuti (2008) studied the habits, food preference and family life of *H. palustris* at Sukantanagar (22°33'N, 88°24'E) and Nalban during January–December 2005. Mallick (2009) compiled the records available since original reporting including further details on the results of survey initiated in September 2005 at nine fisheries (*bheries*) by NEWS than available in Dey (2007). But all these study reports focused only the East Kolkata Wetlands (EKW), RAMSAR site no 1208 ($22^0$25'–$22^0$40'N; $88^0$20'–$88^0$35'E) declared in 2002, which is the last stronghold of *H. palustris* in the world. Bahuguna & Mallick (2010) also gave a detailed species account of *H. palustris,* but did not add any new ecological niche.

Since clarification of the current distribution and status of Bengal Mongoose requires an in-depth study of all non-saline wetlands and adjacent areas remaining to be surveyed in southern West Bengal, a study was conducted by the author from January 2010 to April 2011 in some fragmented ecological niches of the south-western range of Bengal Mongoose (north-eastern part not surveyed), yielding encouraging results and the new records included one from Howrah, one from N. 24-Parganas close to EKW and five from S. 24-Parganas (Mallick 2011).

The original study on Bengal Mongoose (Ghose 1965) recorded six ecological niches in N. 24-Parganas district- one at Sukhchar (August 1964) under Barrackpore Sub-division and five in EKW and its surroundings under Bidhannagar Sub-division. Since then, no new record was reported from the north-eastern range of Bengal Mongoose, as explained before. Even though ZSI surveyed the faunal resources of 65 water bodies, comprising of 21 freshwater *beels, baors* (oxbow lakes) and 44 brackish water *bheries* (fisheries) in N. and S. 24-Parganas districts during the period from 1988–1989 to 1990–1991, no *H. palustris* could be identified in those selected habitats including a few wetlands within Barasat-Madhyamgram-Badu location (Nandi *et al.* 1993).

There is definitely an inherent problem of visual identification of the species in the field. The Bengal Mongoose lives in seclusion and is rarely sighted because it tends to avoid human presence and restricts movement through an inconspicuous route, where human activities are very low, making opportunities to observe the species variable and unpredictable. Even if sighted, the species could not be identified properly or even misidentified, because it usually flees very fast at any sound or disturbance (Mallick 2011).

With this background in view, a survey of the undisturbed northernmost freshwater wetlands under Barasat Sadar Sub-division (north of Bidhannagar Sub-division and east of Barrackpore Sub-division) in search of any leftover population of *H. palustris* through visual sightings followed by photo identification was felt necessary. Accordingly, the author conducted a field survey in Barasat town and surrounding buffer zone having a radius of 10 km (not surveyed for the species earlier) from October 2011 to September 2012.

STUDY AREA (Fig. 1)

All the five sub-divisions under North 24-Parganas district extending over 4,094 km^2, including Barasat (988.305489 km^2), are dotted with numerous freshwater wetlands in the form of *jheel*s (lakes), *beel*s (large ponds), small ponds and natural/excavated drainage system of *khal*s (canals). The identified wetlands in and around Barasat are Makarsha *beel* (19.1 acres), Badu *beel* (17.66 acres), Thakur *beel* (7.50 acres), Panna *jheel,* Ghosh pond (locally called *pukur*), Bhatrapallyer pond, Pioneer pond, Madhumurali pond, Motar pond, Seth pond, Kal pond, Netor pond, Bose pond and many anonymous small waterbodies.

Barasat is one of the oldest towns extending over 34.05 km^2 in the outskirts of Kolkata (21 km to the north). Initially, Barasat was the headquarters of a joint magistracy, known as the Barasat District, but in 1861, on a readjustment of boundaries Barasat district was abolished and converted into a subdivision, now district headquarters. During the eighteenth century, the indigo planters and subsequently the British administrators like Lord Hastings as well as many native elites had made many garden houses with natural water bodies in Barasat, which still harbour a diverse wetland flora and fauna.

The climate of the study area is tropical [Temperature: 44°C in May (Max) and 10°C in January (Mean), relative humidity: between 55% in March and 98% in July, annual rainfall: 1,579 mm (normal)]. The monsoon usually takes place from early June to mid-September. The weather remains dry during the winter (mid-November to mid-February) and summer (mid-February to early June). No river flows by the town. However, fragmented portions of the dried up River Sonai, abutting Barasat Road (22°41'37"N, 88°24'16"E), are still visible. So the wetlands of the study area are ombrotrophic (rainfed). As a result, there is scarcity of water for the wetland-dependent fauna during the dry weather.

Barasat subdivision is densely populated [283,443 (provisional) in 2011 with a very high growth rate of 3.5% per year]. It is crisscrossed by a very busy road-cum-rail network. The National Highway 34, National Highway 35, State Highway 2, Madhyamgram-Badu Road and other local roads as well as a railway track cut through the study area. Barasat is now converted to an ecologically sensitive area.

MATERIALS AND METHODS

The study adopted a suite of methodologies, which included literature review, interviews with the local people and active members of NGOs (Non-governmental Organisations) and field survey. After conducting a preliminary investigation and in consultation with the concerned resource persons, the study area was divided into four quadrants according to the cardinal directions (northeast, southeast, southwest and northwest) and six concentric rings of 2 km radius each, and from these 24 sectors (four quadrants and six concentric circles) to identify the existing inland freshwater wetlands for field survey.

The identified ecological niches were monitored during daytime (the species being a diurnal forager from sunrise to sunset, i.e. 06 h to 18 h) in all the seasons, spending 120 person-days. The species was recorded only by direct sighting. The adult female was visually identified by observing three pairs (1 abdominal and 2 inguinal) of mammae. In addition, a wire trap, having partition, was also baited with a live country chicken inside the smaller compartment and placed at a convenient undisturbed location of the foraging route of the resident mongooses under camouflage of leaves of water-hyacinth and monitored from a safe distance of about 7 m by using a binocular. The trapped species was identified, measured, weighed, sexed, marked with black hair-dye and released at the point of capture within an hour. Moreover, the species was accurately identified by collation of a series of photographs taken by a hidden camera from different angles, showing the animal in varied postures and behaviours as proposed by Mallick (2011).

RESULTS AND DISCUSSION

A literature review has revealed that from November 1964 up to April 2011 (c. 47 years) *H. palustris* has been reported from twenty two fragmented sites within its known range, i.e. southern West Bengal (Table 1). The newly discovered site at Barasat is the twenty third ecological niches of the species. Previously, no secondary sources recorded Barasat as a potential habitat of *H. palustris.* During the present study, sighting records and photographic evidences of a foraging mongoose could be collected from a microhabitat, i.e. an old garden house fringed by a small freshwater wetland at Barasat by the side of NH 34 near Lali Cinema Hall (22°43'38"N, 88°28'48"E), falling within the northeast quadrant of the study area.

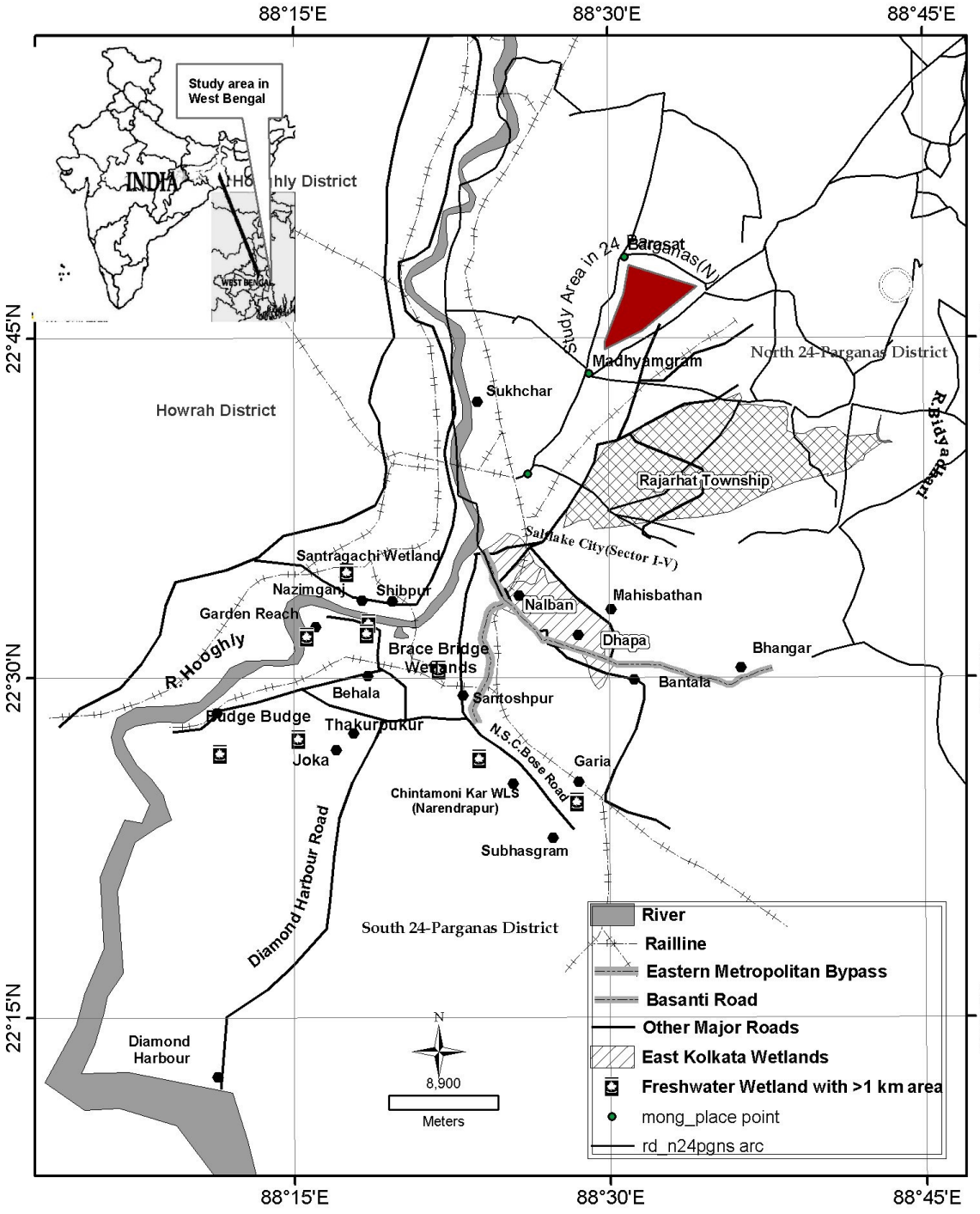

Figure 1. Map of study area.

According to the old records, the range of *H. palustris* was earmarked by four extreme location points, viz. Sukhchar (N. 24-Parganas) on the north (16 km from Kolkata), Budge Budge (S. 24-Parganas) on the west (16 km from Kolkata), Bhasna (S. 24-Parganas) on the south (110 km from Bidhannagar), and Rajarhat (north-east of EKW, N. 24-Parganas) on the east (7 km from Bidhannagar). Now, after discovery of a new ecological niche at Barasat (N. 24-Parganas), the north-eastern range of Bengal Mongoose is extended horizontally from 88°22′E to 88.28°E. So, the known north-south range of *H. palustris* now stretches over >130 km from Barasat on the north (N. 24-Parganas) to Diamond Harbour on the south (S. 24-Parganas), whereas the western and eastern limits are Santragachhi (Howrah) and Barasat respectively and no record of present occurrence of the Bengal Mongoose is available from any habitat located in between these two locations.

Prima facie, species identification was considered most crucial for the field survey because each and every sighted mongoose in the study area might not be *H. palustris.* The Bengal Mongoose is often misidentified as Small Indian Mongoose, the credible record of which is not available from any non-saline wetland within the known ecological range of Bengal Mongoose including the study area. However, a foraging *H. edwardsii* was once sighted and photographed in 2009 in the same garden house at Barasat (and often at Badu, south-east of Barasat, during the present survey, where no *H. palustris* was found). In spite of thorough search, no burrow could be detected in the garden house of Barasat. Whereas the foraging Bengal Mongoose at Barasat inhabits the wetland close by, the foraging Grey Mongoose at the same location possibly strayed from its original habitat around Badu because no species of mongoose was found at Madhyamgram.

To avoid confusion in the field, the distinguishing features of Grey Mongoose were verified for proper identification of the species sighted at the garden house and adjacent wetlands during monitoring. Even if the Bengal Mongoose seems closer in size to the Grey Mongoose, the latter is larger by c. 6 mm with grey coat, heavier build, thicker and bushier tail, higher stance (due to longer legs, particularly the hind ones), and, above all, absence of any dark patch on the muzzle (Mallick 2011). Whereas the dorsal guard hairs of *H. palustris* are alternately banded with ochraceous buff and Prout's brown with Prout's brown tip, those of *H. edwardsii* are clove brown tipped, then alternately banded with cream buff and clove brown and, in some of the hairs, overall ferrugineous tinge is evident (De *et al.* 1998).

Both the resident adult male and female Bengal Mongooses were temporarily captured [following the protocol of Dey (2007)] on separate occasions in a trap with chicken bait and then measured and weighed. Sexual dimorphism was marked in the two trapped individuals. The adult male was found to be 4 cm larger and c. 300 g heavier than the adult female.

The identification marks of *H. palustris* described by Ghose (1965) hold good of the sighted foraging individual in the garden house at Barasat, which are also prominent in the series of photographs (n = 29) taken. *H. palustris* is dimorphic in colour, with dark and light forms (Alfred & Chakraborty 2002). Whereas the former has individual contour hairs alternately banded black and buff-yellow, the latter has them banded blackish brown and straw yellow. These forms are not correlated with season, age or sex. Sighting records and photographic evidences of both grey and rufous phases of the Bengal Mongoose were found (Mallick 2011). The Bengal Mongooses sighted at Barasat belong to the latter category (grey phase), having a dark suffusion on the muzzle, stronger and slightly longer head with bulging forehead and the cranium narrowing abruptly behind the orbit so that the postorbital region appears as a constriction between the frontals and cranium. No seasonal change in their pelage was observed during monitoring.

The Bengal Mongoose is a fossorial animal living around shallow non-saline water bodies, fully or partially covered with a thick growth of aquatic plants. The area surrounding the occupied burrow is devoid of such clay particles unlike those of large bandicoot rats and fresh scratch marks are seen near the mouth of burrow. At Barasat, the Bengal Mongooses live in a burrow on the slopes of a small pond, locally called 'Ghosh *pukur*', located within a receding native wetland (0.66 acre), just behind the boundary wall of the garden house.

The wetland is composed of a mediocre floristic diversity. The marshy edge is infested with plants like cattails (locally called *Hogla*), such as *Typha elephantina* and *T. domingensis,* reeds (submerged and emergent) like *Phragmites karka* (*Nal*), sedges (*Madurlathi*) e.g. *Cyperus pangorei* and *C. corymbosus*, shoal (*Aeschynomene aspera*), grasses (*Cynodon dactylon*), *Colocasia esculenta* (*Kachu*), floating Water-hyacinth *Eichhornia crassipes*

Table 1. Past records of *H. palustris* [1964 (January) to 2011 (April)] from southern West Bengal

Location	Sex of recorded animals (♂ = male; ♀ = female)	Date of collection or sighting	Source
District: Howrah			
Botanical Garden, Shibpur (22°33'N, 88°18'E)	1♂	25 November 1964	Collection: B. Biswas, ZSI; Agrawal *et al*. 1992
	4 unsexed (n+q)*	13 September 2010	Sighting: A. Chatterjee verbally 2010
Nazimganj (south of Botanical Garden, Shibpur)	1♂+1♀	26 January 1965	Collection: R.K. Ghose, ZSI; Agrawal *et al*. 1992
Santragachhi Jheel (lake) (22°34'N, 88°16'E)	1 unsexed	January 2010	Sen (2010)
	1 unsexed	14 April 2011	Sighting: D. Bose *in litt.* 2011
District: North 24-Parganas			
Salt Lake (22°35'N, 88°25'E)	19♂+8♀	21 January, 27 April, 7, 21 June, 11, 26 July, 21, 27 December 1964; 21 February, 21 March, 28, 31 (*sic*) June, 28 November, 5 December 1965	Collection: B. Biswas, ZSI; Ghose 1965, Agrawal *et al*. 1992
Bantala (22°31'N, 88°26'E)			
Duttabad (22°36'N, 88°26'E)			
Hederhat (22°29'N, 88°23'E)			
Nalban (22°34'N, 88°25'E) (East Kolkata Wetlands): N° 4 *bheri* (fishery)	3♂+3♀	11 March 2006	Trapped and released: NEWS *in litt*. 2006
	3 unsexed (n)	21 November 2010	Sighting: A. Chatterjee *in litt*. 2010
	1♀+3 cubs (r)	29 January 2011	Trapped and released/ sighting: NEWS *in litt*. 2011
	1 unsexed	17 February 2011	Sighting: S. Jha *in litt*. 2011
	1♂ (n)	19 February 2011	Trapped and released: S. Mallick *in litt*. 2011
	1♂+2 unsexed (n+p)	20 February 2011	Trapped and released/ sighting: S. Mallick *in litt*. 2011
	2♂ (n)	26 February 2011	Trapped and released: S. Mallick *in litt*. 2011
	2 unsexed (n)	26 March 2011	Sighting: S. Mallick *in litt*. 2011
	4 unsexed(n+p)	30 April 2011	Sighting:NEWS *in litt*. 2011
	1 unsexed	January 2012	Sighting: S. Bhattacharya *in litt*. 2012
Keshtopur, Rajarhat wetland (near Bagjola canal) (22°37'N, 88°25'E)	1 unsexed	22 April 2011	Sighting: I. Mitra *in litt*. 2011
Sahebmara bheri (22°33'N, 88°25'E) (East Kolkata Wetlands)	Not known	2004	Anonymous 2004

Table 1. contd….

Sukantanagar (22°33'N, 88°24'E) -Nalban	20 unsexed	January–December 2005	Sighting: K. Deuti, ZSI; Deuti 2008
Sukhchar (22°43'N, 88°22'E)	1♂	2 August 1964	Collection: B. Biswas, ZSI; Agrawal *et al*. 1992
District: South 24-Parganas			
Bhasna (exact location not known)	1♀	28 September 1967	Collection; sightings (presumed): Y. Chaturvedi, ZSI; Ghose & Chaurvedi 1972
Budge Budge (22°28'N, 88°10'E)	Not known	1990s	S. Chattopadhyay *et al*. in Molur *et al*. 1998 and in Walker 1999
Diamond Harbour (22°11'N, 88°11'E)	Not known	1990s	S. Chattopadhyay *et al*. in Molur *et al*. 1998 and in Walker 1999
Green View wetland, Joka (22°26'N, 88°18'E)	1 unsexed	29 November 2010	Sighting: A. Chatterjee verbally 2011
Indian Institute of Management wetland, Joka (22°26'N, 88°17'E)	Not known	2005	Raghu Ram 2005
	1 unsexed	29 December 2010	Sighting: H.G. Mukhopadhyay *in litt*. 2011
Kadamtala, Behala (22°29'N, 88°18'E)	1 unsexed	2009	Sighting: P.K. Biswas *in litt*. 2010
Patiatala (exact location not known)	Not known	1990s	S. Chattopadhyay *et al*. in Molur *et al*. 1998 and in Walker 1999
South Kolkata (exact locality not known)	2 (p)	5 February 2011	Sighting: L. Barman *in litt*. 2011
Subhasgram (22°24'N, 88°26'E)	1 unsexed	1 January 2007	Sighting: S. Bhattacharya *in litt*. 2010
	1 unsexed	10 September 2010	Sighting: S. Bhattacharya *in litt*. 2010
Survey Park, Ajaynagar, Santoshpur (22°29'N, 88°23'E)	1 unsexed	9 November 2010	Sighting: S. Bhattacharya *in litt*. 2010

*n= single, p= duo, q= trio, and r= group of four.

(*Kachuri pana*), *Ipomoea aquatica* (*Kalmi*), *Enhydra fluctuans* (*Hingche*), *Marsilea minuta (Sushni), Diplazium esculentum (Dhenki), Alternanthera philoxeroides (Ban-hingche), Nymphaea nouchali, N. pubescens (Shaluk* or water lilies), *Centella asiatica* (*Thankuni*), *Hygrophilia schulli (Kulekhara), Bacopa monnieri (Brahmi), Nasturtium officinale (Shimralya* or water cress). These plants form the typical habitat of Bengal Mongoose. But, there is no shade tree in and around the wetland.

The Bengal mongoose prefers the peri-urban and non-forest habitat for diurnal shelter in the reed beds and thickets of aquatic plants, which are also its hunting grounds. But it takes nocturnal shelter in the secluded burrow on the slope of narrow mud-bank. It is a natural predator and forages within a fixed small range around the wetland in search of prey (primarily small fish and aquatic insects and secondarily amphibians, reptiles, birds and small mammals) (Mallick 2011). Though the Bengal Mongoose is a diurnal species, it is a very shy animal, generally hiding in the reeds or long grasses and aquatic vegetation and avoiding the disturbed areas.

Since the wetland at the new site is not connected to any permanent source of water or subject to periodic flooding except during incessant rains, summer droughts, evaporation and gradual infiltration cause the smaller depression to dry up, changing the associated plant and animal life. Due to falling water level, the marsh vegetation dies off. As a result, the

Figure 1(a). Body postures displayed by the photographed Bengal Mongoose at Barasat

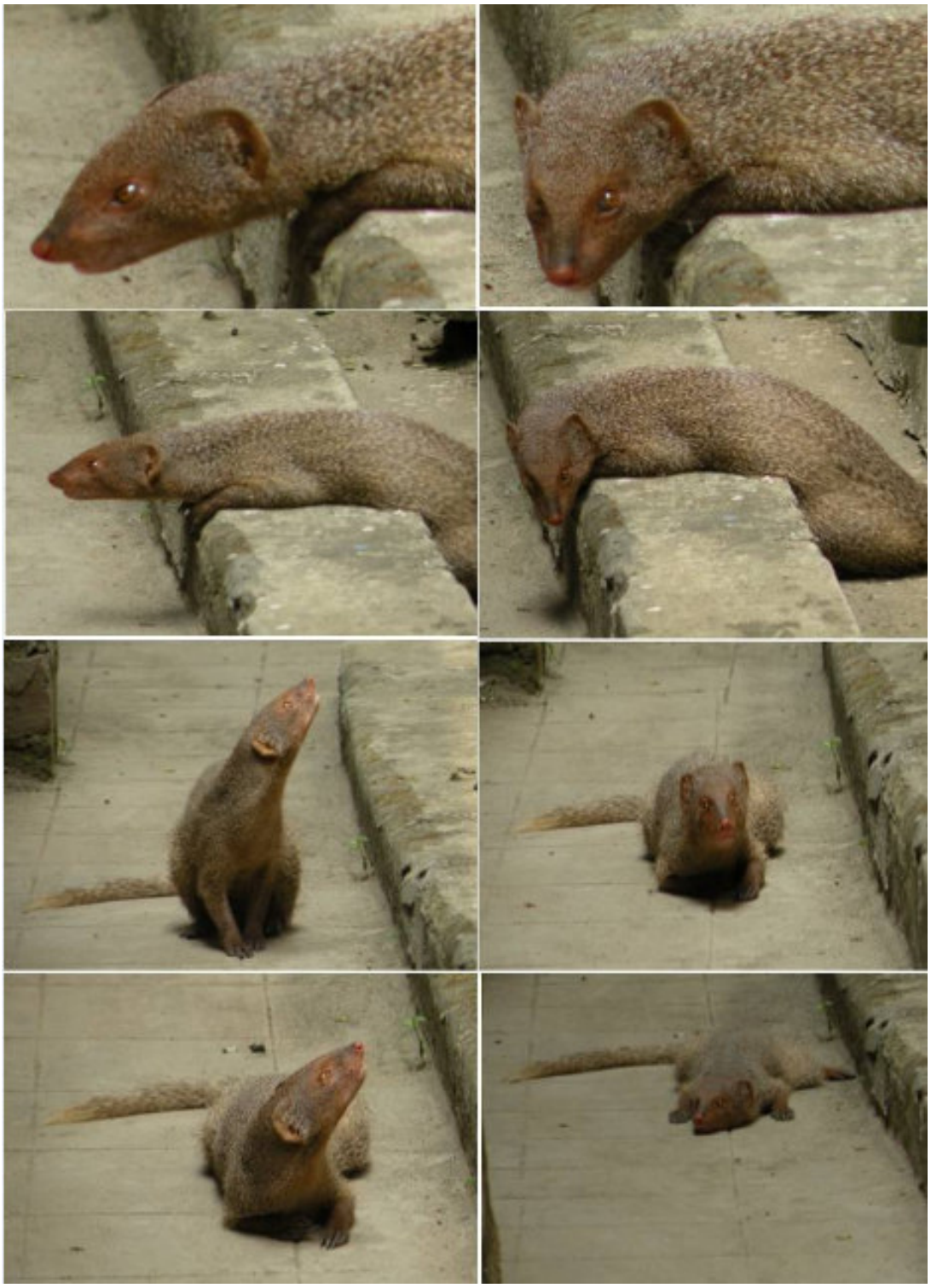

Figure 1(b). Body postures displayed by the Bengal Mongoose taking mid-day shelter in the garden house at Barasat

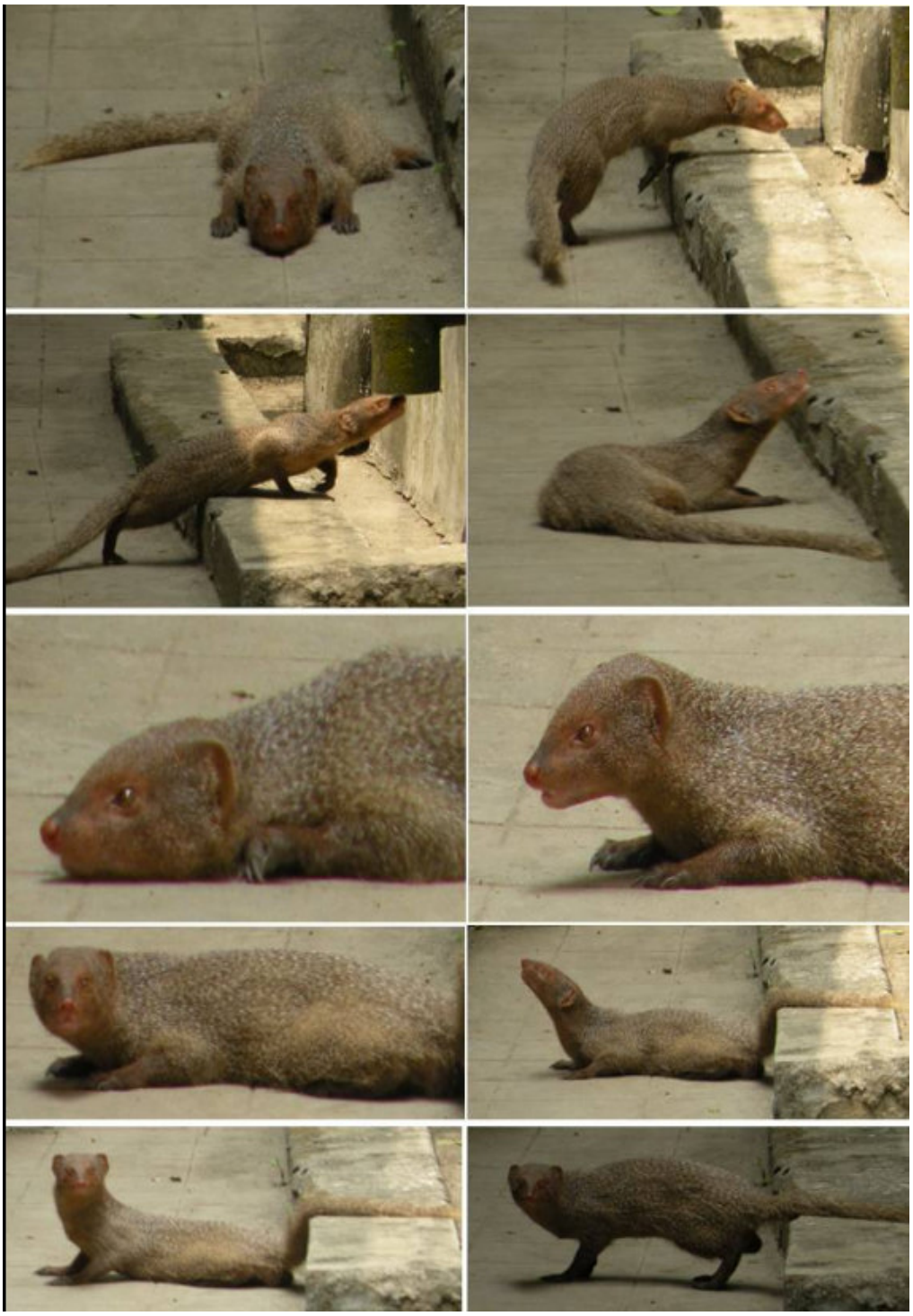

Figure 1(c). Body postures displayed by the Bengal Mongoose taking mid-day shelter in the garden house at Barasat

Figure 1(d). Trapping process on the foraging route of the resident Bengal mongoose

resident mongooses often face acute shortage of their preferred food resources like small fish, aquatic insects and crustaceans in the habitat and seek supplementary food because the quantity and quality of food are important factors for sustenance and individuals with access to supplementary food are expected to have increased reproductive success. It was observed that the visiting mongooses used to visit the garden house for supplementary refuse feeding and consume selectively the fish oil, bones, etc. thrown by the caretaker at the garbage dump. But they were not seen to touch other left over human food items.

The Bengal Mongoose is crepuscular, that is, it is active only at dusk and again at dawn. At Barasat, the mongooses were seen to emerge cautiously from their burrow just after sunrise, then monitor the surroundings and, only if the environment was found undisturbed, they went foraging. Otherwise, they again took refuge in their burrows. The foragers used to return to their burrows before sunset and stay there overnight.

The Bengal Mongoose is susceptible to high temperature. It can forage only within a relatively narrow temperature range (an example of thermal neutrality). During March–June, the midday temperature in the study area actually exceeds this range, when the Bengal Mongoose seeks for a relatively cooler place for resting. After foraging around the wetland in the morning, it retires to a cool and shady spot of the garden house for the remainder of the day. However, on the cloudy days, it was often seen moving around the wetland even during the midday.

The series of photographs of Bengal Mongoose taking shelter in the garden house corroborate this view because the recorded time of its first arrival was around 10 h. The photographic records also indicate that it visited the garden house most frequently during May, when the midday (12–15 h) temperature is very high (up to 44°C) and the heat wave looms large in the open area of the wetland without any tree shade.

The photographed mongoose, while resting in the garden house during midday, displayed various creeping posture or crawling position, rotating the head, gasping, licking or moistening the accessible body parts and lying down on the damp floor in a relaxed position for hours till the day temperature calms down. In the late afternoon, it used to leave for the wetland burrow. Though mainly a ground dweller, the visiting mongoose was at times seen to escape quickly by climbing the hanging branch of a tree by the side of high boundary wall. This is the first record of scansorial behaviour of this species.

In a few newly discovered sites of recently developed urban settlements south of EKW in S. 24-Parganas, the Bengal Mongoose was often found foraging in the backyard gardens in search of food, but was never reported to enter the house premises for supplementary food or temporary shelter (Mallick 2011).

Normally, solitary mongoose was seen at the site (Barasat), but during the breeding season, the male was observed to chase the female along the mud-bank. Deuti (2008) observed that the breeding takes place between January and March in EKW. In the study area, courtship and mating was observed in March. The female gave birth to a litter of three inside the burrow in June, when enough food resources were available in the habitat. Her movement was also restricted during the rearing period. The cubs grew rapidly during the next three months, but did not come out of the burrow. In September, when the mother emerged out of the burrow in the morning for foraging, the cubs were seen to follow her in a line.

The natural, reversible changes in wetlands are almost insignificant compared with the disruption caused by human interference. In the study area, the wetlands are regarded as prime dumping sites of garbage and other refuse. Draining or filling in wetlands destroys the communities of plants supporting wildlife. Building highways through the marshes or erecting masonry structures at the marshy edge of the wetland is also damaging. Due to rapid urbanization in the study area, the marshes bordering the highways have shrunk to only a fraction of what they were during the twentieth century.

The Bengal Mongoose was common when first discovered in N. and S. 24-Parganas district (Ghose 1965, Ghose & Chaturvedi 1972). But the population has declined severely since 1970s due to large-scale conversion of wetlands to new satellite townships (Alfred & Chakraborty 2002, Mallick 2011). Most of the herbaceous (dominated by emergent non-woody vegetation), non-tidal freshwater wetlands (natural or manmade) in the Hooghly sub-delta (mostly left or eastern bank of the river) have been reduced to <20 acres and <2 m deep in the deepest part or completely reclaimed. The area occupied by Bengal Mongoose during the late twentieth century was reported to be <500 km^2 (Molur *et al.* 1998), but Mallick (2011) assessed the probable extent of such area to be <200 km^2, representing a major decline or shrinkage during

the first decade of twenty first century. Destruction of the still-existing water bodies is continuing unabated by deliberate dumping of waste materials/resume filling (fly ash and other garbage) and illegal constructions. Limited distribution compounded by siltation, habitat loss or modification, often associated with fragmentation of habitat due to rapid urban expansion and reclamation, are the main survival threats of the remaining population of Bengal Mongoose.

Following IUCN criteria, *H. palustris* is considered an 'endangered' species (Molur *et al.* 1998). The Indian government in a notification, dated 11 October 2002, upgraded all species of genus *Herpestes* (mongoose) to endangered category [Schedule II, Part II, Wildlife (Protection) Act, 1972]. With upgradation from Schedule IV, the mongooses are supposed to receive the highest level of protection, equivalent to that received by the tiger. A conviction for its illegal trade can lead to a maximum sentence of seven years' imprisonment. But in the non-forest areas, the species and its habitat is not secured. No action programme has so far been taken for conservation of the species and its habitat. Naturalists, ecologists, and many other people have been protesting against illegal wetland encroachment. But, wetland conservation and management or implementation of the wildlife and environmental laws to save the wetlands and wild denizens living therein is still lagging at the grass root level.

The projected population of Barasat by the year 2025 is 525,000 and further uninterrupted encroachment on the receding wetlands would destroy the characteristic flora and fauna including the endemic Bengal Mongoose in near future, leading to severe environmental hazards. Changing public (governments at all levels, conservation groups, and other agencies) attitude is the essential first step in preserving these ecological gifts.

ACKNOWLEDGEMENT

I am grateful to all the respondents to interviews, wildlife enthusiasts and NGOs, who helped in conducting this study at various locations or provided field information to update information on the Bengal Mongoose, specially three resource persons- Subrata Pal Chowdhury (Technical Assistant, Wildlife Wing Headquarters, Forest Directorate, Government of West Bengal), Shibaji Mitra, Secretary, Badu Reptile Conservation Society (BRCS) and Sumanta Mallick. I am also indebted to Indranil Mitra for preparing the site map.

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