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Population Estimation and Habitat Analysis of Indian Grey Mongoose (*Herpestes edwardsii*) in Mirpur District, Azad Jammu and Kashmir

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UA designed the study. MF, AA and MMS collected the data. MF and UA wrote the article. RAM, KBA and MSA reviewed the manuscript and analyzed the data. NID and QZQ helped in field survey and editing the manuscript.

Key words
Grey Mongoose, Population, Habitat analysis, Mirpur, AJ&K

ABSTRACT

To study distribution, population status and habitat utilization of Indian grey mongoose (*Herpestes edwardsii*) 18 localities were sampled from 3 zones created in Mirpur district (Azad Jammu and Kashmir). Random transects of fixed length were laid and number of active burrows counted and habitat analysed using quadrat method. Mongoose was distributed with average population density of 9.8 animal/km^2, with highest (17.8 animal/Km^2) density at Kalyal and lowest (3.5 animal/km^2) at Panyam. Most favored altitudinal range was 450 m to-550 m (asl). Population density was the highest (12 animals/km^2) in October and lowest (7.4 animals/km^2) in May. Dominant vegetation included *Acacia nilotica* (IV= 108.9), *Senegalia modesta* (IV= 94.23), *Broussonetia papyrifera* (IV= 94.19), *Calotropis procera* (IV= 145.46), *Dodonaea viscosa* (IV=120.17), *Cynodon dactylon* (IV= 174.94), *Chrysopogon serrulatus* (IV=152.96) and *Artemisia scoparia* (IV= 105.69), *Parthenium hysterophorus* (IV= 113.82), *Saccharum spontaneum* (IV= 199.88) *Ziziphus mauritiana* (IV= 51.35), *Lantana indica* (IV= 78.39) and *Morus alba* (IV= 31.38).

INTRODUCTION

The Indian grey mongoose (*Herpestes edwardsii* Hilaire, 1818) is a small, slender carnivore with long bushy tapering tail, short legs, sharp and non-retractable claws (Nowak, 1991; Roberts, 1997). The coat is coarse, quite long and grayish to light brown in color with the individual hairs with black and white stripes, giving an overall brownish gray appearance. The muzzle which includes cheeks, edges of the ears and feet have a rusty brown shade (Roberts, 1997; Firouz, 2005; Francis, 2008; MacDonald, 2006). It is found in Saudi Arabia, Bahrain, Kuwait, Iran, Afghanistan, Pakistan, India, Sri Lanka, Nepal, and Indonesia, and has been introduced in Japan (Corbet and Hill, 1992; Wells, 1989; Wozencraft, 2005; IUCN, 2014). In Pakistan, it is widely distributed in different regions in central and northern Sindh, Cholistan, South-Western Punjab and abundantly in Rawalpindi. They are rarely present in southern Balochistan, Kohat, Bannu, Malir and in southern Sindh (Roberts, 1997; Hussain and Mahmood, 2016; Mahmood *et al*., 2018).

Indian grey mongoose is found in disturbed areas, dry secondary forests, thorn forests, open areas near human settlements and also observed in different areas mainly in cultivated fields, bushy vegetation, grasslands, and scrub. Sometime they move in hollow trees, holes in the ground or take shelter under rocks and in drains (Shetty *et al*., 1995; Roberts, 1997; Jnawali *et al*., 2011; Kalle *et al*., 2014).

Present study was aimed at estimating current population, distribution and habitat utilization by Indian grey mongoose in Mirpur.

MATERIALS AND METHODS

Study area

Mirpur district is situated in the southern region of Azad Kashmir. It is located at 33°14.32'N and 73°74.74'E and is 450 m asl. Topographically this region is plain, with scattered small mounds and nullahs, similar to the Pothohar region of Pakistan. Overall climate is hot and dry during summer. Study area was divided in three study

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zones *viz.* Zone A, B and C that in turn were divided in eighteen localities based on geographic conditions.

Zone A was further divided in six localities. First locality, D4 (33°13.51'N and 73°71.98'E) was slightly plain having human settlement. This locality is in developing stage leaving open plots that provide wilderness areas. Chittarpari, another locality of zone A was located at (33°12.16'N and 73°69.11'E) is adjacent to Mangla. This area has bushy vegetation with small mounds. It is thickly populated area and has poultry farm. Third locality, Bankhurma also called as Mian Muhammad Town (33°13.25N and 73°74.62'E) included a blend of hilly and plain areas, which are occupied by human settlement and side regions have wild flora in the form of *Acacia nilotica* and *Lantana indica* species. Chechian (33°10.44'N and 73°72.72'E), the fourth locality of zone A, was characterized with plain area where mostly land is used for cultivation of wheat, barley, rice and corn. Sang (33°08.37'N and 73°79.26'E) is the fifth locality of this zone. Main characteristics included plain area under agricultural use and major crops are wheat, sugarcane, barley, rice and corn. Human population is distributed in patches giving a blend of semi-urban characteristics. The sixth locality of zone A is Naugran (33°05.40'N and 73°78.06'E), which includes plain cultivation, canal banks with natural vegetation and human settlement (Fig. 1).

Six localities were included in second study zone, *i.e.* Zone B comprised Mehmoodabad (33°16.62'N and 73°86.28'E) was 20 Km from Mirpur and has an intermingling high and plain area. This locality is less populated by humans though natural vegetation existed at the within town. Islamgarh (33°18.48'N and 73°83.20'E), second important locality of zone B, was mainly plain and cultivated area. It is at the distance of 30 km form Mirpur district. Rahra (33°21.80'N and 73°82.59'E) was third locality of this zone, which was characterized by scanty bushy vegetation and mostly having plain land though some hillocks are found in it. The locality Palak (33°32.85'N and 73°75.45'E) of zone B, having similar topographic and habitat features of Rahra locality; however it has less human settlement. Kalyal (33°22.45'N and 73°76.57'E) and Panyam (33°24.76'N and 73°74.17'E) both were found at Chakswari town, the second major region of Mirpur district. These last two localities included plain area covered with spiny bush vegetation including *Senegalia modesta, Broussonetia papyrifera* and *Parthenium hysterophorus*. Wheat is also cultivated in this region. Thick human population though destroyed natural vegetation with in town, however allied area has enough vegetation and provide good wildlife habitat.

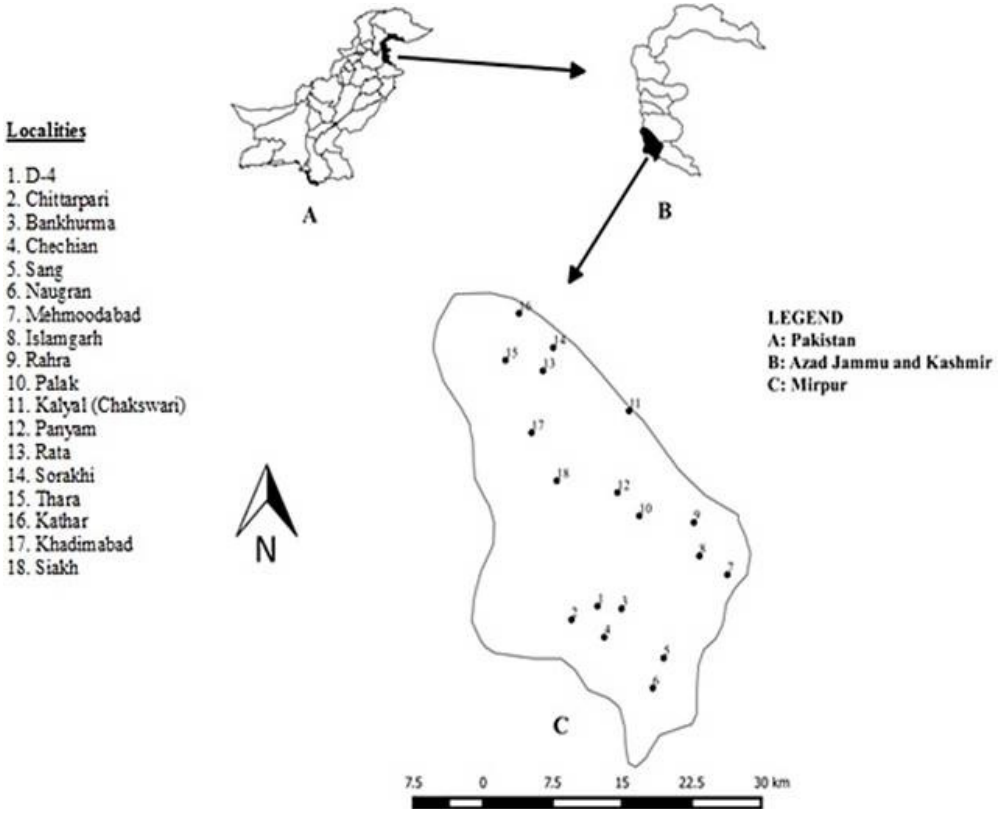

Fig. 1. Map of the study area showing different localities in District Mirpur.

Zone C was divided in to six localities. First locality was Rata (33°36.81'N and 73°65.96'E) at the distance of 70 Km from Mirpur district. Land was a mixture of plain and mounds covered with the vegetation of the most type of *Acacia nilotica* species. Habitat was moderately degraded by the influence of thin human population. Second locality was Thara (33°42.50'N and 73°63.33'E) having similar topographic features of locality Rata. Human interference was less in this locality as compared to Rata. Sorakhi (33°37.87'N and 73°61.84'E) was third locality of zone C characterized with hillock topographic features along with plain area where less agricultural activities have been observed. Kathar (33°42.50'N and 73°63.33'E) was fourth locality of this zone, with ample vegetation cover of *Senegalia modesta, Dodonaea viscosa* species. Topographically this locality has a blend of small hills and plain fields, where tapering cultivation has been noted. The fifth study locality of zone C was Khadimabad (33°30.69'N and 73°64.71'E) that was mainly plain area. Less human settlement has been observed. Most of the area was under cultivation of wheat Crops. Patchy natural vegetation was found in this locality. Siakh (33°25.93'N and 73°67.48'E) was the sixth locality of this zone having similar topographic feature of Khadimabad. Both the localities were found sparsely populated.

METHODOLOGY

In each locality, 1.5 km^2 area was surveyed for population estimation of *Herpestes edwardsii*. A 12 month surveys were conducted on selected sampling sites from April 2013 to March 2014.

Population estimation

Population was estimated at each locality by direct and indirect methods. Direct method included sighting, active burrow count following methods of Mahmood *et al*. (2011). Direct observation of the animals made possible by walking along the transect line. Visits were aliened at the active time of animal which was early morning and evening. Animal sighted or its signs of presence (footprints, faecal material) along transect were also noted and photographed following the method of (Hussain and Mahmood, 2016; Mahmood *et al*., 2018).

Population of species was estimated by applying burrows count method (Cavallini and Nel, 1995; Blaum *et al*., 2007; Mahmood *et al*., 2011). Burrows were identified on the basis of size, proper location and other characteristics described in literature. Active burrows were counted on direct observation and presence of fresh foot prints, faecal pellets and prey remains especially around the burrows. Each active burrow considered to be harbored by only one animal, as most of the researchers stated it a solitary animal (Roberts, 1997; Ahmed, 1998).

Habitat analysis

Habitat analysis was carried out with the help of quadrat method which were for herbs 1 m × 1 m, 5 m × 2 m and 10 m × 10 m for herbs, shrubs and trees respectively. A total of 10 quadrats were laid in each locality for measurement of frequency, density and cover of floral species. Recorded data were used to calculate relative density, relative frequency and relative cover that aggregated to produce importance value index (IVI) of each species (Hussain, 1989; Mahmood *et al*., 2011) while for cover of herbs (Daubenmire, 1959) class method was used. Formulae used for quantification of trees, shrubs and herbs species were as follows:

$$\text{Density} = \frac{\text{Total number of individuals of a species}}{\text{Area sampled}}$$

$$\text{Relative Density} = \frac{\text{Density of a species}}{\text{Total density of all species}} \times 100$$

$$\text{Frequency} = \frac{\text{Total number quadrats with a species}}{\text{Total number of quadrats}}$$

$$\text{Relative Frequency} = \frac{\text{Frequency of a species}}{\text{Total frequencies of all species}} \times 100$$

$$\text{Cover} = \frac{\text{Total canopy cover of a species}}{\text{Number of quadrat(quadrat size)}}$$

$$\text{Relative Cover} = \frac{\text{Canopy cover of a species}}{\text{Total canopy cover of all species}} \times 100$$

Importance Value Index (IVI) for plant species (trees, shrubs and herbs) was calculated by the following formula: IVI = Relative density + Relative frequency + Relative cover

RESULTS AND DISCUSSION

Population distribution

Data revealed that *Herpestes edwardsii* was distributed in all the localities of the 3 study zones of Mirpur. Highest sightings were recorded in locality Rata (n=11), followed Chittarpari (n=8) and Bankhurma and Mehmoodabad (n=7) in each. Lowest sightings (n=1) were recorded at 5 localities including Chechian, Sang, Panyam, Thara and Siakh. Indian grey mongoose has been documented in various neighboring areas of Mirpur in a number of studies. Roberts (1997) reported this species

from Pothohar region (including Jhelum that is adjacent zone A and the southern border of district Mirpur). In recent study, Mahmood *et al*. (2018), reported that this species has been found in Jhelum, Chakwal, Rawalpindi and Gujar Khan Regions. Rais *et al*. (2011) reported the distribution of Indian grey mongoose from Chotiari wetland complex, Sanghar district of Sindh province. Prior to these studies, Taber *et al*. (1967) confirmed the distribution of *Herpestes edwardsii* in Faisalabad region of Punjab province.

Population density

Data analysis showed that the maximum population density (0.65±0.03 animal/ha) was recorded at zone B, followed by (0.63±0.02 animal/ha) at zone C, while minimum (0.48±0.01 animal/ha) population density was estimated at zone A (Table I). Analysis of Variance (ANOVA) showed that there was highly significant difference (*p=0.00, df=18*) among population of mongoose in different study localities of all zones (Table I).

In least populated zone A, a total of 73 active burrows, were recorded in its all six localities. Highest population density (0.107 animal/ha) was recorded in Chittarpari locality, followed by D 4 (0.098 animal/ha) and Chechian (0.092 animal/ha), while lowest population density (0.052 animal/ha) was recorded at Naugran locality (Table I).

The total numbers of animal sighted in this zone during the study period were 23 and highest sightings (n= 8) were recorded in locality Chittarpari whereas lowest sightings (n=1) were noted at Chechian and Sang (Fig. 2). Zone B was highly populated zone, where average numbers of active burrows was 99.48 scattered in six different localities of this zone. Highest (0.178 animal/ha) population density was recorded in Kalyal (Chakswari), followed by Palak locality (0.143 animal/ha) while lowest (0.035 animal/ha) population density was recorded at Panyam locality (Table I). This locality also remained inactive during the month of August, September, October

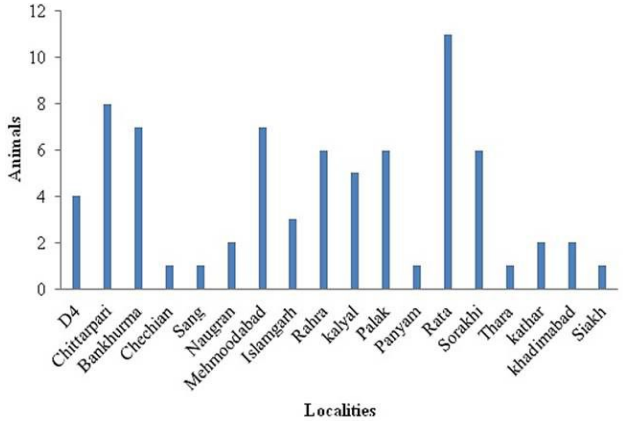

Fig. 2. Sighting records of mongoose in different localities during 2013-14.

Table I.- Population density of *Herpestes edwardsii* at different localities of Mirpur during 2013-14.

Study Zone	Locality	Altitude (m asl)	Mean No. of burrows	No of active burrow ± Std. Error	Estimated population density (animal/ha)	Total population density (animal/ha)
A	D4	360	21.83	14.83 ± 0.63	0.098	0.48
	Chittarpari	330	22.5	16.33 ± 0.71	0.107	
	Bankhurma	400	17.5	11.83 ± 0.25	0.078	
	Chechian	255	21	13.83 ± 0.48	0.092	
	Sang	250	12	8.00 ± 0.41	0.053	
	Naugran	240	13.16	7.83 ± 0.25	0.052	
B	Mehmoodabad	400	22.66	16.5 ± 1.18	0.11	0.65
	Islamgarh	380	19.5	12.5 ± 0.63	0.083	
	Rahra	430	24	17.16 ± 1.11	0.114	
	Kalyal	410	38.16	26.83 ± 0.48	0.178	
	Palak	380	27.5	21.16 ± 0.85	0.143	
	Panyam	360	7.5	5.33 ± 1.78	0.035	
C	Rata	480	27.83	20.83 ± 0.82	0.138	0.63
	Sorakhi	540	32	25.33 ± 0.58	0.168	
	Thara	545	20	13.83 ± 0.75	0.092	
	Kathar	540	17	11.83 ± 0.48	0.078	
	Khadimabad	420	16.66	10.33 ± 0.65	0.068	
	Siakh	380	16.66	10.33 ± 0.48	0.082	

Table II.- Altitudinal variation in population density of Mongoose in study area during study period.

Altitudinal class (asl) m	Area surveyed (Km^2)	Total burrows	Active burrows	Sighting	Indirect Evidences			Population density (Animal/Km^2)	Population density (Animal/ha)
					Faeces	Footprints	Prey remains		
I (Below 350)	36	412	275	12	15	19	1	7.64	0.076
II (350-450)	90	1279	893	42	21	40	19	9.92	0.099
III (450-550)	36	581	431	20	12	6	1	11.97	0.120

and November because in these month water level rises up to 1242 feet, so animals migrate surrounding areas and again come in the month of December and onward back when level decreases that's why less no of animal were present. The total numbers of animal sighted in this zone during the study period were 28 and highest sighting (n=7) were in locality Mehmoodabad and lowest sighting (n=1) in Panyam locality (Fig. 2). In group maximum number of animals (n=3) were sighted in locality Rahra.

Zone C which was also further divided in six localities having different population density and number of burrows. The average numbers of active burrows were estimated to be 92.48. Highest mean numbers of active burrows were noted in locality Sorakhi that resulted in highest (0.168 animal/ha) population density in this locality, followed by Rata (0.138 animal/ha). Lowest population density (0.068 animal/ha) was recorded at Khadimabad and Siakh localities (Table I). The total numbers of animal sighted in this zone during the study period were 23 with highest sightings (n= 11) in locality Rata whereas lowest sightings (n=1) were recorded at Thara and Siakh (Fig. 2). At one time maximum no of animal sighted (n=5) were in locality Rata which was largest group in all localities.

Results could be compared with the findings of Shetty *et al*. (1995) who concluded a density ranged between 0.048 animal/km^2 to 0.118 animal/km^2 in Sariska tiger reserve, Rajhistan, India. Kalle *et al*. (2014) recorded a mean abundance range of Indian grey mongoose from 0.12 ± 0.073 to 0.68 ± 0.35 in western Ghat, India. Jnawali *et al*. (2011) estimated a total of 10000 individuals in Chitwan National Park, Nepal, that is higher than the population estimated during present study.

Population density of Indian grey mongoose was evaluated at different altitudinal levels of the study area. Highest population density of 0.12 animals/ha was noted in Class III (450 m to-550 m) while minimum (0.08 animals/ha) population density was recorded as in Class I (below 350 m) (Table II). Although there was no pertinent literature for radial comparison of altitudinal aspects of population density, most of researchers reported this species in plain areas. Roberts (1997), Ahmed (1998), Mirza (1998), Rais *et al*. (2011) and Taber *et al*. (1967) reported this species from Punjab and Sindh provinces, that more or less having similar altitudinal ranges.

Season pose important effects on grey mongoose population. During present study, highest population density (0.12 animals/ha) was recorded in the month of October 2013, followed by March 2014 (0.113 animal/ha) and December 2013 (0.110 animal/ha) whereas lowest population density (0.074 animals/ha) was recorded in the month of May 2013 (Table III), resulting an average high population in winter or wet season. This view is testified by a recent study conducted by Kalle *et al*. (2014) in India. They reported the mean abundance of grey mongoose increased in wet season (λ mean 0.68 ± 0.35) was higher than dry (summer) season (λ mean 0.34 ± 0.16). Detection probability may increase in winter season due to frequent rains, which facilitated grey mongoose to leave a more visible footprint on ground as compared to dry season. Furthermore during winter season, deciduous trees shed off their leaves, consequently enhanced sightings and burrows detection probability of this animal (Kumara and Singh, 2007). Likewise, in winter season, food of grey mongoose reduced and animal has to extend its home range to meet its food requirement.

Habitat analysis

Habitat analysis of the Indian grey mongoose was carried out at the 18 localities of the study area to determine the habitat characteristics of this specie. Vegetation is important because it provides animals with suitable hiding places, proper hinder escape and increase detection of prey so that they can easily capture them (Lima, 1990; Schooley *et al*., 1996; Santiapillai *et al*., 2000; Blumstein *et al*., 2004). The habitat of Indian grey mongoose in the study area consist upon a mixture of plain and mounds regions covered with thorny vegetation, cultivated lands and scrub forests.

Phytosociological analysis showed that the dominant plant species were *Acacia nilotica* (IV= 108.9), *Senegalia modesta* (IV= 94.23), *Broussonetia papyrifera* (IV= 94.19), *Calotropis procera* (IV= 146.45), *Dodonaea viscosa* (IV=120.17), *Cynodon dactylon* (IV=174.94), *Chrysopogon serrulatus* (IV=149.21) and *Artemisia*

scoparia (IV= 105.69) in most of the study localities (Tables IV, V, VI). Kalyaal locality is the potential habitat of Indian grey mongoose having highest population density (0.178 animal/ha) having dominant plant species such as *Acacia nilotica* (IV= 100.98), *Parthenium hysterophorus* (IV= 94.23) and *Chrysopogon serrulatus* (IV=149.21). Habitat of this locality generally characterized by open land, scrub forest in a combination of cultivated areas, such a potential habitat was documented in various studies including Janawali *et al*. (2011) in Nepal, Kait and Sahi (2012) in Jammu and Kalle *et al*. (2014) in western Ghats, India. Another locality containing higher (0.168 animal/ha) population density was Sorakhi that has a dominant vegetation of *Senegalia modesta* (IV= 75.84), *Saccharum spontaneum* (IV= 123.82) and *Artemesia scoparia* (IV= 105.69). This locality contained plain and hilly topographic

Table III.- Monthly variation in population density of mongoose in study area during 2013-14.

Months	Area surveyed (Km^2)	Total burrows	Active burrows	Sighting	Indirect evidences			Population density (Animal/Km^2)	Population density (Animal/ha)
					Faeces	Footprints	Prey remains		
Apr-13	6	86	61	3	0	3	0	10.17	0.102
May-13	9	97	67	7	1	2	0	7.44	0.074
Jun-13	16.5	218	165	14	3	4	2	10	0.10
Jul-13	9	101	70	4	1	4	1	7.78	0.078
Aug-13	15	213	158	7	5	2	2	10.53	0.105
Sep-13	16.5	203	132	5	5	5	2	8	0.080
Oct-13	6	96	72	1	1	2	2	12	0.120
Nov-13	7.5	98	68	2	3	2	0	9.07	0.091
Dec-13	18	260	182	10	7	9	9	10.11	0.101
Jan-14	18	251	173	8	9	5	2	9.61	0.096
Feb-14	22.5	360	248	9	5	13	0	11.02	0.110
Mar-14	18	289	203	4	8	12	1	11.28	0.113

Table IV.- Comparison of importance value of trees, shrubs and herbs of different localities of Zone A of the study area during study period.

Species	Localities					
	D.4	Chittarpari	Bankhurma	Chechian	Sang	Naugran
Senegalia modesta	44.47	35.05	-	-	-	-
Acacia nilotica	-	94.91	71.89	92.96	91.94	71.69
Broussonetia papyrifera	44.8	14.27	63.45	75.04	94.19	77.01
Dalbergia sissoo	63.75	11.08	61.64	-	59.86	45.86
Morus alba	10.03	-	12.49	-	-	31.38
Prosopis cineraria	48.19	56.83	65.88	119.25	-	-
Calotropis procera	58.44	51.21	50.83	-	84.78	89.42
Lantana indica	-	33.77	62.84	78.39	-	-
Parthenium hysterophorus	94.32	53.62	-	113.82	-	-
Prosopis juliflora	68.96	94.72	79.08	-	-	-
Saccharum spontaneum	78.23	66.64	108.6	107.78	-	199.88
Ziziphus nummularia	-	-	-	-	158.65	110.66
Ajuga bracteosa	-	-	91.1	71.63	-	60.68
Artemisia scoparia	52.6	84.24	-	-	-	
Cynodon dactylon	129.8	174.94	100.06		161.17	143.01
Cannabis sativa	43.19	-	-	94.56		60.7
Sonchus arvensis	-	-	-	-	52.74	-

Table V.- Comparison of importance value of trees, shrubs and herbs of different localities of Zone B of the study area during study period.

Species	Localities					
	Mehmoodabad	Islamgarh	Rahra	Kalyal	Palak	Panyam
Senegalia modesta	60.85	37.22	43.25	-	72.84	80.47
Acacia nilotica	93.67	84.98	108.99	100.98	26.78	73.02
Dalbergia sissoo	72.82	64.24	65.99	66.14	57.36	60.61
Ziziphus mauritiana	28.83	36.54	25.45	22.45	-	-
Calotropis procera	58.69	146.45	74.1	-	66.33	91.72
Parthenium hysterophorus	-	-	108.62	94.23	92.5	139.72
Ricinus communis	123.43	-	42.01	73.43	48.78	68.52
Ziziphus nummularia	117.94	73.63	-	-	-	-
Artemisia scoparia	-	104.23	-	63.44	-	58.81
Cynodon dactylon	138.13	-	82.53	-	127.8	123.8
Canabis sativa	-	-	-	25.73	-	-
Chrysopogon serrulatus	-	-	-	149.21	-	74.9
Euphorbia helioscopia	71.45	76.87	-	-	66.43	-
Rumex nepalensis	-	-	51.21	61.56	-	-

Table VI.- Comparison of importance value of trees, shrubs and herbs of different localities of Zone C of the study area during study period.

Species	Localities					
	Rata	Sorakhi	Thara	Kathar	Khadimabad	Siakh
Senegalia modesta	54.11	75.84	94.23	93.79	93.62	79.31
Acacia nilotica	65.4	-	20.9	44.16	61.25	38.75
Carissa opaca	-	-	22.71	9.05	-	-
Dalbergia sissoo	41.52	62.31	41.74	36.09	50.77	39.14
Azadirachta indica	14.72	-	22.18	30.93	-	21.18
Olea ferruginea	18.88	22.38	-	11.49	-	-
Ziziphus mauritiana	26	-	23.9	-	18.95	51.35
Calotropis procera	-	-	69.08	53.39	85.77	47.38
Dodonaea viscosa	120.17	-	88.14	113.2	-	-
Saccharum spontaneum	-	123.82	-	-	121.34	69.04
Ziziphus nummularia	74.23	-	69.26	80.18	-	98.52
Artemisia scoparia	94.4	105.69	-	-	-	-
Cynodon dactylon	-	88.83	-	-	151.1	-
Chrysopogon serrulatus	-	-	133.95	101.08	-	152.96
Malva sylvestris	49.53	-	43.32	-	35.31	63.45
Sonchus arvensis	-	-	70.89	-	61.6	-

features with open forest, scrub land and also cultivated fields and is comparable with Shetty *et al*. (1995), Rais *et al*. (2011) and Kalle *et al*. (2014).

Least populated locality Panyam had *Senegalia modesta* (IV= 80.47), *Parthenium hysterophorus* (IV= 139.72) and *Cynodon dactylon* (IV=123.8) dominant species among tree, shrubs and tree, respectively (Table V). Dominant plants recorded during present study are the characteristic species of dry thorn scrubs as documented in earlier studies (Roberts, 1997; Mirza, 2011) in Punjab areas of Pakistan. Similar habitat of Indian grey mongoose was reported in previous literature (Prater, 1980; Choudhury *et al*., 2013; Kait and Sahi, 2012). Prater (1980) reported this specie in scrub lands, open forests, near cultivated fields and human habituation in land. Choudhury *et al*. (2013) supported the same view point stating that scrublands as a potential habitat of this species.

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Statement of conflict of interest

Authors have declared no conflict of interest.

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