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## COMMUNICATION

### WINTER FOOD HABITS OF THE COMMON PALM CIVET *PARADOXURUS HERMAPHRODITUS* (MAMMALIA: CARNIVORA: VIVERRIDAE) IN PATNA BIRD SANCTUARY, INDIA

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## WINTER FOOD HABITS OF THE COMMON PALM CIVET *PARADOXURUS HERMAPHRODITUS* (MAMMALIA: CARNIVORA: VIVERRIDAE) IN PATNA BIRD SANCTUARY, INDIA

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**Abstract:** Food habits of the Common Palm Civet *Paradoxurus hermaphroditus* were investigated using scat analysis method, a technique widely used to study small and medium sized mammals. We analyzed 112 scats of Common Palm Civet between November 2012 and March 2013 from the Patna Bird Sanctuary and found a total of nine food items. Out of 112 scats, 32.09% scats contained three food items, 29.62% scats had two items, 24.69% scats contained four prey items, and 3.7% scats had seven prey items. The results show that the Common Palm Civet is more frugivorous (ca. 39.28%) than insectivores (ca. 29.46%). Percent frequency of occurrence showed that insects contributed maximum in the diet of Civet (29.46±2.29) followed by fruits of *Ficus religiosa* (19.64±1.13), *Prosopis juliflora* (11.60±0.18), and Date Palm (*Phoenix sylvestris*) (8.03±0.23), while birds contributed 9.82±0.02 and rodents 6.25±0.44. Rufous-tailed Hare (*Lepus nigricollis ruficaudatus*) (1.78±0.96) contributed the minimum in the Common Palm Civet diet. PBS is an Important Bird Area site and it harbours thousands of migratory birds during winter. But the results show that birds are a less preferred diet item of the Common Palm Civet.

**Keywords:** Civet, diet, food preference, frugivorous, insectivores, scat analysis, Uttar Pradesh.

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**Author contribution:** The data was collected by KAK and NM, while the analysis and paper writing is done by KAK under the supervision of JAK and KA.

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## INTRODUCTION

There are eight species of civets found in India (Prater 1971; Menon 2014). Among them, the Common Palm Civet *Paradoxurus hermaphroditus* (Viverridae) is a small size carnivore with widespread distribution in central, southern and southeastern Asian countries including Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, India, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Thailand, and Vietnam (Pocock 1933; Duckworth et al. 2016). In India, the Common Palm Civet is distributed throughout except in the desert zone and Punjab and lives in tropical forests, plantations, fruit orchards and human-settlements, often residing in eaves of houses or outbuildings (Prater 1971; Menon 2014). Although widely distributed in Asia, the Common Palm Civet is a less studied animal in comparison to other carnivores (Joshi et al. 1995) and very little is known about its current status and ecology (Krishnakumar & Balakrishnan 2003). The Common Palm Civet is listed in Appendix III in the Convention on International Trade of Endangered Species (CITES), and as Least Concern by the IUCN Red List, and Schedule II in Wildlife (Protection) Act 1972 of India.

The Common Palm Civet is an omnivorous and opportunistic forager. Its diet varies according to habitat and season (Jothish 2011). It is a nocturnal species and feeds on a variety of foods including fruits and flesh (Joshi et al. 1995; Grassman 1998; Krishnakumar & Balakrishnan 2003). In forested areas, it is primarily frugivorous, feeding on berries and pulpy fruits including those of figs and palms and is an effective seed disperser (Rabinowitz 1991; Corlett 1998; Nakashima et al. 2010). It is often considered a pest because of its raiding of coffee plantations, other fruit crops, and poultry (Prater 1971).

Direct observations of feeding behaviour are often difficult under field conditions. Scat analysis is one of the primary tools used to assess carnivore diets, especially when focusing on individual prey items. Scat analysis has been used to know the dietary composition of major carnivores throughout the world (Schaller 1967; Jethva & Jhala 2004; Giannatos et al. 2005).

Hairs are the most important part for identifying prey species consumed by predators. Different species have different kinds of shape, size and structure of medulla and cuticle (Teerink 1991). The present paper reports the winter food habits of the Common Palm Civet in the Patna Bird Sanctuary, Uttar Pradesh, India.

## MATERIALS AND METHODS

### Study Area

PBS is situated in Jalesar Tehsil of the Etah District of Uttar Pradesh. The bird sanctuary is situated at 27.526°N–78.320°E. The PBS has 109ha area which contains a small jheel along with a track of date palm trees (*Phoenix sylvestris*). Patna Jheel is a typical rain-fed wetland. The wetland can be categorised as natural fresh water, shallow wetland or jheel (Rahmani & Daniel 1997). The eastern part of the sanctuary is covered with dense Date Palm trees (Fig. 1) while the boundary of the sanctuary and trails are covered with *Prosopis juliflora*.

More than 180 species of birds were reported from PBS (Ahmad & Javed 2000), and thousands of migratory birds visit every winter in this IBA site. The Golden Jackal *Canis aureus*, Jungle Cat *Felis chaus*, Fishing Cat *Prionailurus vivverinus*, Indian Fox *Vulpes bengalensis*, and Common Palm Civet *Paradoxurus hermaphroditus* are common meso-predators of the area. PBS has ample prey species like Indian Bush Rat *Golunda ellioti*, Rufous-tailed Hare *Lepus nigricollis ruficaudata*, and avian fauna. There is a variety of tree species found in the sanctuary including *Phoenix sylvestris*, *Prosopis juliflora*, *Ficus religiosa*, *Ficus recemosa*, *Acacia* spp., *Ziziphus* spp., *Pithecelobium dulce*, *Morus alba*, *Dalbergia sissoo*, *Azadiracta indica*. Beside these woody plant species, the sanctuary contains aquatic vegetation that consists of *Hydrilla verticillata*, *Salvinia*, *Azolla*, *Ceratophyllum demersum*, *Vallisneria spiralis*, *Potamogeton crispus*, and *Eichhornia crassipes*. On the outer reaches of the wetlands, *Ipomea carnea* and *I. aquatica* grow in excess (Ahmad & Javed 2000).

### METHODS

It is very complex to find each prey item contributing to the diet of a carnivore species by direct observation in the field. Thus scat analysis method is broadly used to find out food habits of carnivores because of its non-invasive nature, easy collection and analysis (Korschgen 1980; Ackerman et al. 1984; Reynolds & Aebischer 1991). To determine the food habits of Common Palm Civet, we used the scat analysis method. A total of 112 scats were randomly collected from the travel routes, trails, roosting sites (Image 1), and den sites which were present in different habitat types of the Sanctuary.

The scats of Common Palm Civet were identified based on their occurrence in more-or-less the same location as the roosting animal(s), elongated shape in

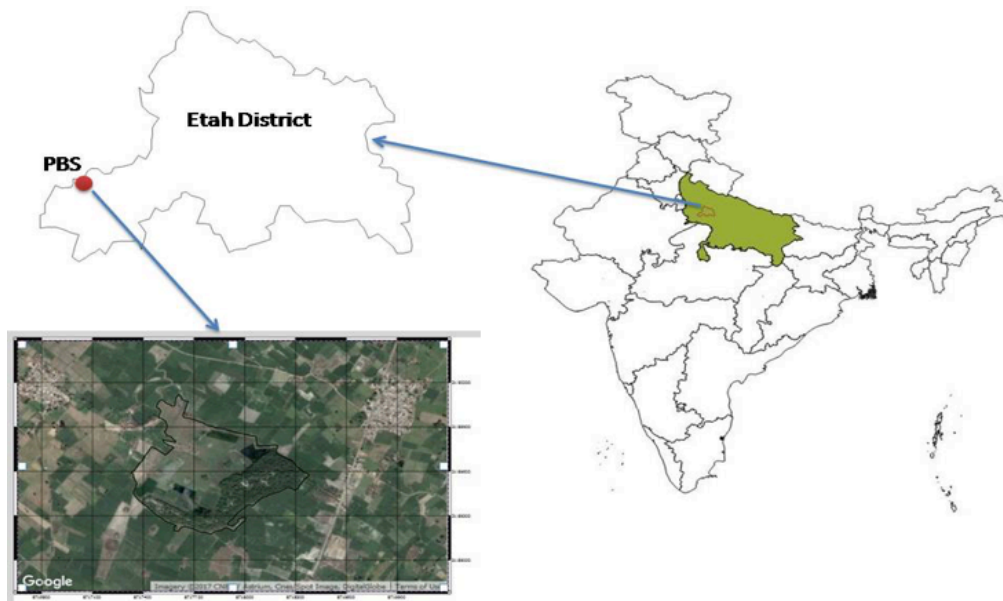


Image 1. Patna Bird Sanctuary, Etah, Uttar Pradesh, India.



Image 1. Common Palm Civet in Patna Bird Sanctuary.

nature and composition of undigested plant or animal matter; however, the ambiguous scats were not used in analysis. The scats were collected from November 2012 to March 2013. Scats were collected from identified dens of Common Palm Civets and stored in zipped polythene bags and additional information was recorded such as habitat, GPS coordinates, time and date of collection. The collected scats were sun dried, and washed in running tap water through a sieve. The remains, like hairs, feathers, seeds, bones, grasses were separated and sun dried for further identification of species and observation through microscope and macro lens. At least 20 hairs were picked randomly from each scat. The hairs were treated with xylene to see clear structure of medulla. These hairs were mounted on permanent slides and observed under microscope to identify the prey species. The hairs were compared with the already

made reference slides and hair guard manual of Wildlife Institute of India (Bahuguna et al. 2010) made with the collected hairs during the study period from PBS. The seeds which were not identified during the scat analysis were sown in pots and after germination these were identified by a taxonomist to avoid any possible error.

The percentage of occurrence of a prey item was calculated as the numbers of items of a specific prey item that were found to occur in scat and expressed as a percentage of all prey occurrences (Floyd et al. 1978; Weaver & Fritts 1979; Ackerman et al. 1984). The frequency of occurrence of prey species in the scat was computed as the number of occurrence of each prey type divided by total number of scat analysed and expressed as percentage (Corbett 1989; Jethva & Jhala 2004).

## RESULTS

In 112 scats, one to seven prey items were recorded (Table 1). The maximum numbers of prey items (seven) were found in 3.70% scats, followed by six prey items in 9.87% scats while three, two and four prey items were found in 32.09%, 29.62%, and 24.69% scats respectively. A single prey item was recorded in 8.73% of the scats. The decreasing order of frequency of occurrence found in the Common Palm Civet diet is presented in Fig. 2.

The maximum percent of occurrence was recorded for Insects ( $29.46 \pm 2.29$ ) followed by *Ficus religiosa* seeds



**Table 1. Percentage of scats containing different number of prey items.**

Number of prey item	Number of scats	Percentage of scat
One	9	8.73
Two	26	29.62
Three	32	32.09
Four	21	24.69
Five	13	16.04
Six	8	9.87
Seven	3	3.70

**Table 2. Percent frequency of occurrence with standard error and confidence level.**

Prey Item	Percentage occurrence	Standard Error	Confidence Level (95%)
<i>Prosopis juliflora</i>	11.60	0.18	0.35
<i>Ficus religiosa</i>	19.64	1.13	2.21
Insects	29.46	2.29	4.48
Grass	4.46	0.65	1.27
Birds	9.82	0.02	0.03
Rodents	6.25	0.44	0.86
Jackal	3.57	0.75	1.47
Rufous-tailed Hare	1.78	0.96	1.88
Date Palm	8.03	0.23	0.45
Unidentified	5.35	0.54	1.05

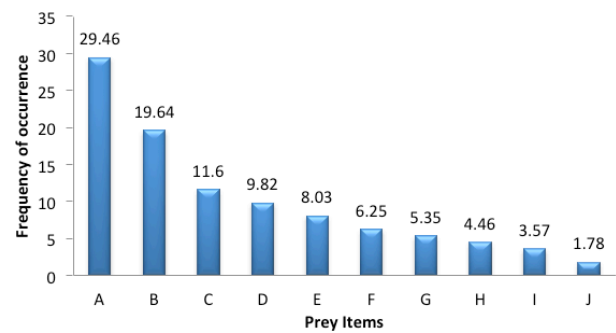
**Table 3. Percentage of food items according to the food habits of Common Palm Civet.**

Food habit	Frugivorous	Insectivorous	Carnivorous	Other
No. of prey item	44	33	24	11
Percentage	39.28	29.46	21.42	9.82

(19.64±1.13), *Prosopis juliflora* seeds (11.60±0.18), and Date Palm seeds (8.03±0.23), while the birds contributed (9.82±0.02) in Palm Civet diet (Fig. 1; Table 2).

Over all the Palm Civet is more frugivorous than insectivorous and carnivorous as the fruits contribute 39.28% of its diet, followed by insects 29.46% and mammals 21.42% (Table 3). It is found that the Palm Civet scavenges on road killed jackal (3.57±0.75).

The seeds collected from the scat were sowed to identify the plant species and germination rate was found to be more than 90%. Undigested parts of *Ficus racemosa* were also observed in the scats of the Common Palm Civet but due its ambiguity it was recorded as unidentified. Among the insects termites encompassed

**Figure 2. Overall visualisation of the scat contents in Common Palm Civet diet in PBS. A—Insects | B—Fruit of *Ficus religiosa* | C—Fruit of *Prosopis juliflora* | D—Birds | E—Date Palm | F—Rodents | G—unidentified | H—Grass | I—Jackal | J—Rufous-tailed Hare.**

the bulk in the Common Palm Civet diet. Plastics were also recorded in the scats of the Common Palm Civet.

## DISCUSSION

The Common Palm Civet is among the more frugivorous viverrids (Corlett 1998). No systematic studies on its diet have been carried out in India (Singh 1982; Krishnakumar & Balakrishnan 2003); however, Krishnakumar & Balakrishnan (2003) and Jothish (2011) studied some aspects of food habit and diet composition of the Common Palm Civet and its role in seed dispersal. Fruits have been recorded as a major component in the diet of the Common Palm Civet in studies carried out in different countries including Nepal (Joshi et al. 1995), Thailand (Rabinowitz 1991; Grassman 1998), and Myanmar (SuSu & Sale 2007). Moreover, the study carried out in India also revealed that fruit is a predominant component (82% and 95%) in the Common Palm Civet diet (Krishnakumar & Balakrishnan 2003; Jothish 2011). The present study also shows that the Common Palm Civet is more frugivorous (39.28%) than insectivorous (29.46%). The fruit content is found less in the diet of the Common Palm Civet in comparison to earlier studies because of less availability of fruits in and around the PBS.

Bekele et al. (2008) observed a high rate of scavenging in human habitats by the African Civet *Civettictis civetta* in Ethiopia. Balakrishnan & Sreedevi (2007) observed that faeces of Small Indian Civets *Viverricula indica* often contained cooked rice and fish bone; however, we did not find any evidence of fish or cooked rice in the present study. The high percentage of insects (29.46%) in the Common Palm Civet diet is perhaps because of their congregation habits around street lamps. Most faeces

contained two, three and four food items in the scats of Common Palm Civet, showing that there was a scarcity of food items for the palm civet while (Jothish 2011) suggested that the civet(s) ate a single source in bulk at a particular feeding time. The frequent occurrence of grass leaves in the faeces ( $4.46 \pm 0.65$  of total faeces) is consistent with other studies, pointing to a possible role of grass leaves in scouring the intestine and in the digestion process (Grassman 1998; Krishnakumar & Balakrishnan 2003; Balakrishnan & Sreedevi 2007; Mudappa et al. 2010).

Palm Civets ate at least 18 fruit species in Kerala (Jothish 2011), mostly from non-native plants (Nayar et al. 2006). Krishnakumar & Balakrishnan (2003) identified only 10 fruit species from Common Palm Civet faeces in two semi urban habitats in Thiruvananthapuram, Grassman (1998) found 13 fruit species in faeces pooled from Common and Masked Palm Civet *Paguma larvata* in Kaeng Krachan National Park (Thailand) and SuSu & Sale (2007) found 31 types of fruits in Common Palm Civet faeces analysed from Hlawga, Myanmar. In the present study eight fruit species were recorded from Common Palm Civet faeces.

The presence of jackal's hair in the scats of Common Palm Civet shows that it is an opportunistic feeder. The possibility of direct hunting on jackal is very rare but it may hunt on fawn of jackals as there is a good population of jackals in PBS. Birds consisted of 9.82% in the Common Palm Civet diet and this number is very low as the PBS is well known as a congregation site of migratory as well as residential birds. PBS is also an IBA site; however, birds contribute about 40% in the Golden Jackal diet in winter (Khan et al. 2017). Feathers and bones of babbler ( $n=2$ ) were also recorded in the Common Palm Civet scats. A similar observation by Balakrishnan & Sreedevi (2007) on the stomach content of Small Indian Civets showed that only the head region of a babbler was chewed and feathers and body were left intact.

The civets are known for seed dispersal as the fleshy parts of fruits were digested by its digestive system but the seeds remained unaffected during this process. Frugivores and carnivores may disperse seeds (Herrera 1989; Nakashima et al. 2010). When an animal ingests fruits, the successful dispersal of the seeds depends on the feeding behaviour of the frugivores, after consumption and gut passage and the movement of animals. The seeds collected from the faeces were undamaged and did not lose their viability after the gut passage. When the seeds were sowed for the identification of species the germination rate was found about to be 90%. According to studies (Jothish 2011)

civets are threats for the poultry as they raid and kill the fowls. But during this study we did not find any evidence of fowl hunting.

## REFERENCES

- Ackerman, B.B., F.G. Lindsey & T.P. Hemker (1984). Cougar food habits in Southern Utah. *Journal of Wildlife Management* 48: 147–155.
- Ahmad, A. & S. Javed (2000). An ornithological and physicochemical study of Patna Bird Sanctuary, Etah, Uttar Pradesh. Department of Wildlife Sciences, Aligarh Muslim University, Aligarh, 72pp.
- Bahuguna, A., V. Sahajpal, S.P. Goyal, S.K. Mukherjee & V. Thakur (2010). *Species identification from Guard Hair of selected Indian Mammals, Reference Guide*. Wildlife Institute of India, 460pp.
- Balakrishnan, M. & M.B. Sreedevi (2007). Husbandry and management of the Small Indian Civet *Viverricula indica* (E. Geoffroy Saint-Hillaire, 1803) in Kerala, India. *Small Carnivore Conservation* 36: 9–13.
- Bekele, T., B. Afework & M. Balakrishnan (2008). Feeding ecology of the African Civet *Civettictis civetta* in the Menagesha Suba State Forest, Ethiopia. *Small Carnivore Conservation* 39: 19–24.
- Corbett, L.K. (1989). Assessing the diet of Dingoes from feces: a comparison of three methods. *Journal of Wildlife Management* 53: 343–346.
- Corlett, R.T. (1998). Frugivory and seed dispersal by the vertebrates in the Oriental (Indomalayan) region. *Biological Reviews* 73: 414–448.
- Duckworth, J.W., R.J. Timmins, A. Choudhury, W. Chutipong, D.H.A. Willcox, D. Mudappa, H. Rahman, P. Widmann, A. Wiltng & W. Xu (2016). *Paradoxurus hermaphroditus*. The IUCN Red List of Threatened Species 2016: e.T41693A45217835. <https://doi.org/10.2305/IUCN.UK.2016-1>
- Floyd, T.J., L.D. Mech & P.A. Jordan (1978). Relating wolf scats content to prey consumed. *Journal of Wildlife Management* 42: 528–532.
- Giannatos, G., Y. Marinos, P. Maragou & G. Catsadorakis (2005). The status of the Golden Jackal (*Canis aureus* L.) in Greece, Belgian. *Journal of Zoology* 135(2): 145–149.
- Grassman, L.I. (1998). Movements and fruit selection of two *Paradoxurinae* species in a dry evergreen forest in southern Thailand. *Small Carnivore Conservation* 19: 25–29.
- Herrera, C.M. (1989). Frugivory and seed dispersal by carnivorous mammals and associated fruit characteristics in undisturbed Mediterranean habitats. *Oikos* 55: 250–262.
- Jethva, B.D. & Y.V. Jhala (2004). Foraging ecology, economics and conservation of Indian wolves in the Bhal region of Gujarat, Western India. *Biological Conservation* 116: 351–357.
- Joshi, A.R., J.L.D. Smith & F.J. Cuthbert (1995). Influence of food distribution and predation pressure on spacing behaviour in palm civets. *Journal of Mammalogy* 76: 1205–1212.
- Jothish, P.S. (2011). Diet of Common Palm Civet (*Paradoxurus hermaphroditus*) in a rural habitat in Kerala, India, and its possible role in seed dispersal. *Small Carnivore Conservation* 45: 14–17
- Khan, K.A., J.A. Khan & N. Mohan (2017). Winter food habits of Golden Jackal in Patna Bird Sanctuary. *Journal of Threatened Taxa* 9(9): 10656–10661. <https://doi.org/10.11609/jott.3301.9.9.10656-10661>
- Korschgen, L.K. (1980). Procedure for food habits analysis, pp. 113–128. In: Schemnitz, S.D. (ed.). *Wildlife Management Techniques Manual*. The Wildlife Society Washington, D.C.
- Krishnakumar, H. & M. Balakrishnan (2003). Feeding ecology of the Common Palm Civet *Paradoxurus hermaphroditus* (Pallas) in semi-urban habitats of Trivandrum, India. *Small Carnivore Conservation* 28: 10–11.
- Menon V. (2014). *Indian Mammals. A Field Guide*. Hachette Book Publishing India Pvt. Ltd. Sector 44, Gurgaon, India., 528pp.
- Mudappa, D., A. Kumar & R. Chellam (2010). Diet and fruit choice of the Brown Palm Civet *Paradoxurus jerdoni*, a viverrid endemic to the Western Ghats rainforest, India. *Tropical Conservation Science* 3:

- 282–300. <https://doi.org/10.1177/194008291000300304>
- Nakashima, Y., E. Inoue, M. Inoue-Murayam & J.R.A. Sukor (2010).** Functional uniqueness of a small carnivore as seed dispersal agents: a case study of the Common Palm Civets in the Tabin Wildlife Reserve, Sabah, Malaysia. *Oecologia* 164: 721–730. <https://doi.org/10.1007/s00442-010-1714-1>
- Nayar, T.S., A.R. Beegam, N. Mohanan & G. Rajkumar (2006).** *Flowering plants of Kerala - A Handbook*. Tropical Botanic Garden and Research Institute, Thiruvananthapuram, India.
- Pocock, R.I. (1933).** The palm civets or toddy cats of the genera *Paradoxurus* and *Paguma* inhabiting British India. *Journal of the Bombay Natural History Society* 36: 855–877.
- Prater, S. (1971).** *The Book of Indian Animals*. Bombay Natural History Society and Oxford University Press, Bombay, India.
- Rabinowitz, A.R. (1991).** Behaviour and movements of sympatric civet species in Huai Kha Khaeng wildlife sanctuary, Thailand. *Journal of Zoology* 223: 281–298.
- Rahmani, A.R., & J.C. Daniel (1997).** Management Plan of Patna Bird Sanctuary, Jalesar, District Etah, Uttar Pradesh. Bombay Natural History Society, Mumbai.
- Reynolds, J.C. & N.J. Aebischer (1991).** Comparison and quantification of carnivore diet by faecal analysis: a critique with recommendations, based on the study of the Fox (*Vulpes vulpes*). *Mammalian Review* 21: 97–122
- Schaller, G.B. (1967).** *The Deer and The Tiger. A Study of Wildlife in India*. University of Chicago Press, Chicago, 384pp.
- Singh, L.A.K. (1982).** Stomach contents of a Common Palm Civet *Paradoxurus hermaphroditus* (Pallas). *Journal of the Bombay Natural History Society* 79: 403–404.
- Su Su & J. Sale (2007).** Niche differentiation between Common Palm Civet *Paradoxurus hermaphroditus* and Small Indian Civet *Viverricula indica* in regenerating degraded forest, Myanmar. *Small Carnivore Conservation* 36: 30–34.
- Teerink, B.J. (1991).** *Hair of West European Mammals*. Cambridge University Press, Cambridge, 224pp.
- Weaver, J. & S.H. Fritts (1979).** Comparison of Coyote and Wolf scat diameters. *Journal of Wildlife Management* 43: 786–788.





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#### Article

##### Ornithophony in the soundscape of Anaikatty Hills, Coimbatore, Tamil Nadu, India

– Chandrasekaran Divyapriya & Padmanabhan Pramod, Pp. 14471–14483

#### Communications

##### A case study on the public knowledge and awareness of the Philippine Pangolin *Manis culionensis* (Mammalia: Pholidota: Manidae)

– Frances Mae Tenorio & Joselito Baril, Pp. 14484–14489

##### Winter food habits of the Common Palm Civet *Paradoxurus hermaphroditus* (Mammalia: Carnivora: Viverridae) in Patna Bird Sanctuary, India

– Khursid Alam Khan, Jamal Ahmad Khan, Khursheed Ahmad & Narendra Mohan, Pp. 14490–14495

##### Report of five interesting avian species from Durgapur ecoregion, West Bengal, India by citizen science effort

– Sagar Adhurya & Shantanu Bhandary, Pp. 14496–14502

##### Brief insight into the behavior, activity, and interspecific interactions of urban *Trimeresurus (Cryptelytrops) albolabris* (Reptilia: Squamata: Viperidae) vipers in Bangkok, Thailand

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##### The distributional pattern of benthic macroinvertebrates in a spring-fed foothill tributary of the Ganga River, western Himalaya, India

– Vijay Prakash Semwal & Asheesh Shivam Mishra, Pp. 14511–14517

##### Seasonal vegetation shift and wetland dynamics in vulnerable granitic rocky outcrops of Palghat Gap of southern Western Ghats, Kerala, India

– Pathiyil Arabhi & Maya Chandrasekharan Nair, Pp. 14518–14526

##### A comprehensive checklist of endemic flora of Meghalaya, India

– Aabid Hussain Mir, Krishna Upadhaya, Dilip Kumar Roy, Chaya Deori & Bikarma Singh, Pp. 14527–14561

##### Shola tree regeneration is lower under *Lantana camara* L. thickets in the upper Nilgiris plateau, India

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##### Overcoming the pollination barrier through artificial pollination in the Wild Nutmeg *Knema attenuata* (Myristicaceae), an endemic tree of the Western Ghats, India

– Murugan Govindakurup Govind, Koranapallil Bahuleyan Rameshkumar & Mathew Dan, Pp. 14569–14575

#### Short Communications

##### The first photographic record of the Red Panda *Ailurus fulgens* (Cuvier, 1825) from Lamjung District outside Annapurna Conservation Area, Nepal

– Ganesh Ghimire, Malcolm Pearch, Badri Baral, Bishnu Thapa & Rishi Baral, Pp. 14576–14581

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##### Dhole *Cuon alpinus* (Mammalia: Carnivora: Canidae) rediscovered in Bardia National Park, Nepal

– Shailendra Kumar Yadav, Babu Ram Lamichhane, Naresh Subedi, Ramesh Kumar Thapa, Laxman Prasad Poudyal & Bhagawan Raj Dahal, Pp. 14582–14586

##### Observations of Brown Mongoose *Herpestes fuscus* (Mammalia: Carnivora: Herpestidae) in the wet evergreen forests of the Western Ghats, India

– Vignesh Kamath & Kadaba Shamanna Seshadri, Pp. 14587–14592

##### Further studies on two species of the moth genus *Paralebeda Aurivillius* (Lepidoptera: Bombycoidea: Lasiocampidae) from northwestern India

– Amritpal Singh Kaleka, Devinder Singh & Sujata Saini, Pp. 14593–14598

##### The genus *Grewia* (Malvaceae: Grewioideae) in Andaman & Nicobar Islands, India with a conservation note on the endemic *G. indandamanica*

– K.C. Kishor & Mayur D. Nandikar, Pp. 14599–14605

##### Three grasses (Poaceae), additions to the flora of Andhra Pradesh, India

– Anil Kumar Midigesi & Boyina Ravi Prasad Rao, Pp. 14606–14611

##### Ethnobotanical survey of indigenous leafy vegetables consumed in rural areas of Terai-Dooars region of West Bengal, India

– Mallika Mazumder & Anup Kumar Sarkar, Pp. 14612–14618

##### Australasian sequestrate Fungi 20: *Russula scarlatina* (Agaricomycetes: Russulales: Russulaceae), a new species from dry grassy woodlands of southeastern Australia

– Todd F. Elliott & James M. Trappe, Pp. 14619–14623

#### Notes

##### The Himalayan Crestless Porcupine *Hystrix brachyura* Linnaeus, 1758 (Mammalia: Rodentia: Hystricidae): first authentic record from Bangladesh

– Mohammad Ashraf Ul Hasan & Sufia Akter Neha, Pp. 14624–14626

##### A new distribution record of *Asplenium scalare* Rosenst. (Aspleniaceae) in India

– Periyasamy Vijayakanth, Jaideep Mazumdar, S. Sahaya Sathish, Veluchamy Ravi & Ramachandran Kavitha, Pp. 14627–14628

#### Response & Reply

##### Response to spiders of Odisha: a preliminary checklist additions to the spider checklist of Odisha

– John T.D. Caleb, Pp. 14629–14630

##### Reply to response: spiders of Odisha

– Sudhir Ranjan Choudhury, Manju Siliwal & Sanjay Keshari Das, Pp. 14630

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