

Magazine of Zoo Outreach Organization  
[www.zoosprint.zooreach.org](http://www.zoosprint.zooreach.org)

# ZOO'S PRINT



Communicating Science for Conservation

ISSN 0971-6378 (Print); 0973-2543 (Online)  
Vol. XXXVII, No. 3, March 2022



# ZOO'S PRINT

Communicating science for conservation

Vol. XXXVII, No. 3, March 2022

ISSN 0971-6378 (Print); 0973-2543 (Online)

## Contents

Eric Ramanujam, 01–02.

People's Biodiversity Register in India: Its genesis, significance, and way forward.  
-- Amit Kumar<sup>1</sup>, Pallavi Vishnoi<sup>2</sup> & Atul Kumar Gupta, 03–09.

### Human-Animal Interaction

Deviant death of elephants in agrarian landscapes in southern Bengal  
-- Santanu Mahato, Aritri Chatterjee & Susanta Basani, 10–12.

Road kills of wild animals – the ignored human-animal interface  
-- Ashratha Anoop, 13–16.

### MIN

A record of Tricolour Sharkminnow from southern India: an addition to the introduced fish fauna of the river Cauvery.  
-- Naren Sreenivasan, 17–20.

### SMALL MAMMAL MAIL

Rat trapping for the dietary protein supplement in northern West Bengal.  
-- Sachin Ranade, 21–22.

The rare black Northern Palm Squirrel from Haryana, India  
-- Amit Kumar<sup>2</sup> Parmesh Kumar<sup>1</sup> Sarita Rana<sup>3</sup> & Parul, 23–25.

### Bugs R All

Diversity of Spider fauna in Sundarvan, Ahmedabad, India  
-- Paras Parikh, Adit Nair, Deep Shah, 26–32.

Black-spotted Pierrot, addition to the butterfly fauna of Chhattisgarh, India.  
-- Gulab Chand, H.N. Tandan & Ravi Naidu, 33–36.

On a collection of Orthoptera from Allahabad District, Uttar Pradesh, India.  
-- Hirdesh Kumar, Kailash Chandra, Jagdish Saini<sup>3</sup> & Sandeep Kushwaha, 37–43.

### frog leg

New distribution record of Bhupathi's Purple Frog from Agamalai Hills, Western Ghats, India.  
-- A. Kalaimani, 44–45.

### Bird-o-soar

Sighting of the Critically Endangered Christmas Island Frigatebird off Chombala Coast, Kerala.  
-- Abdulla Paleri, K.R. Aju & E.V. Amal, 46–49

Photo Contest (Theme: Plant-Animal Interactions) Winners, 50–52.



# Mario Eric Ramanujam

**Principal Investigator (Faunistics), Pitchandikulam Forest Consultants**  
<<http://www.pitchandikulamforest.org>>

I met Eric for the first time when he visited Zoo Outreach Organization in 1994 with his dad. A tall lanky chap wanting to get out of the advertising field and looking for opportunity to work in wildlife, he joined us briefly as a wildlife illustrator. Sally and I were very impressed by his abilities and Eric stayed with us in the office for a month. Only, we hardly met as he was nocturnal. He created some amazing art work for ZOO, but his habits were better suited for working from home. So he went back to Pondicherry and continued working part time for ZOO. He took on other occupations and finally joined Pitchandikulam where he blossomed and excelled in bringing his skills of wildlife art, corporate talk, and people management to the fore.



He took on various biodiversity inventory studies — he had keen interest in fishes and small mammals. Various surveys in little known areas for fishes led him to lead parallel lives.

His keen interest in observations were unparalleled. With little training in behavioural studies, Eric went on to master his skills with observing the Indian Eagle Owl, eventually helping in establishing the Indian subspecies' identity apart from the widely known European one. His unique approach to these observations included sketching the behaviours out in classical detail. Read the many publications on the subject in Zoos' Print Journal and the Journal of Threatened taxa.

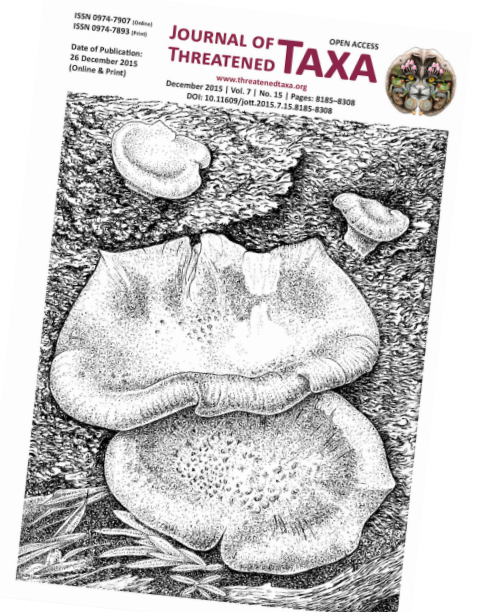
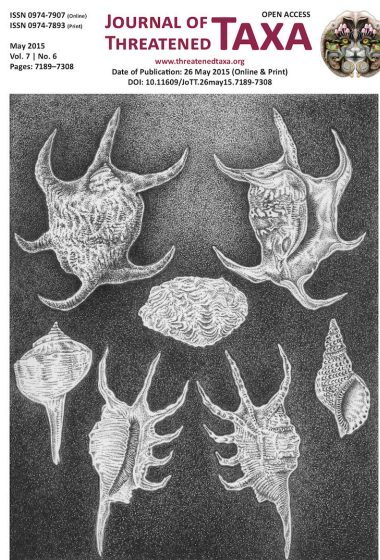
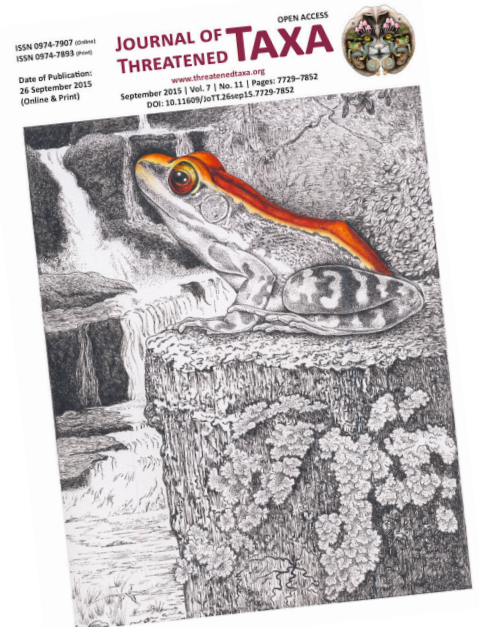
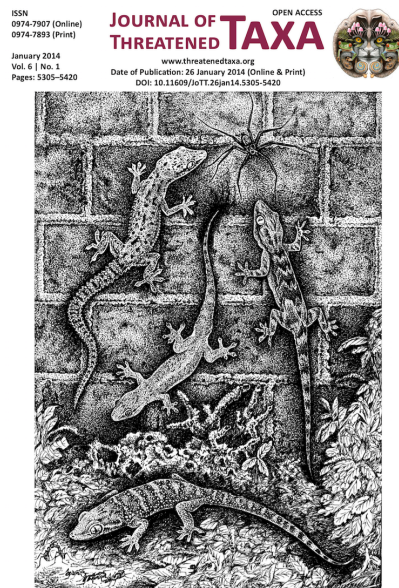
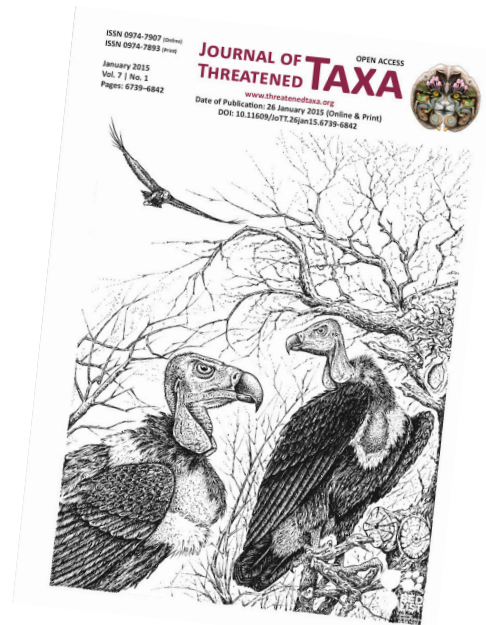
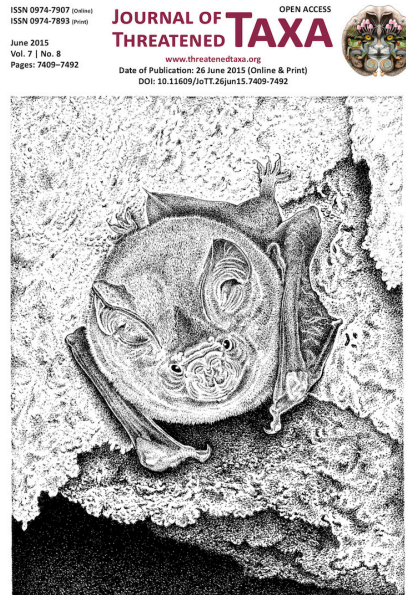
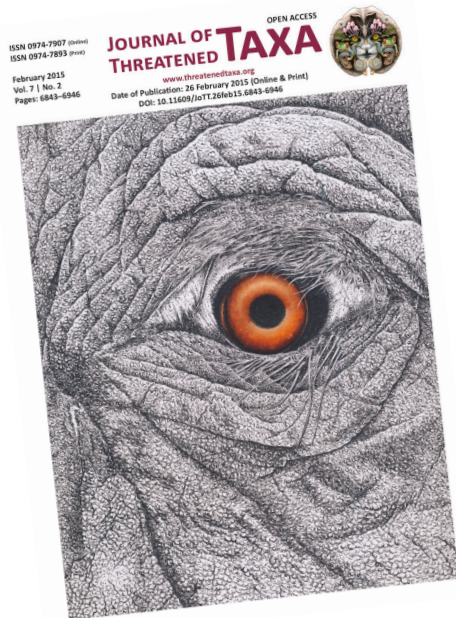
Eric and I shared many commonalities and were pretty close philosophically and colourful language. We were perfect sounding boards for our troubles and spent quite a number of non-sober evenings on the phone and ensured the details were worked out on his occasional trips to Coimbatore or Bangalore, or mine to Pondy.

Eric contributed his time and a complete series of drawings for JoTT covers for five years — his way of helping out with the journal. His works on wildlife art and sculptures are best seen at Pitchandikulam, Nilgiri Biosphere Nature Park, Adayar Poonga, Toyota Kirloskar Campus, East Coast Road, among other places. Gentle soul, kind hearted although very misunderstood, Eric found a good place and friend in Joss Brooks who supported him throughout and let him work his magic.

Thank you, Eric for who you were and what you did. I'll miss you. I know you wouldn't want to get emotional or go on with saying more. So, I'll just shut the fuck up!

Sanjay Molur







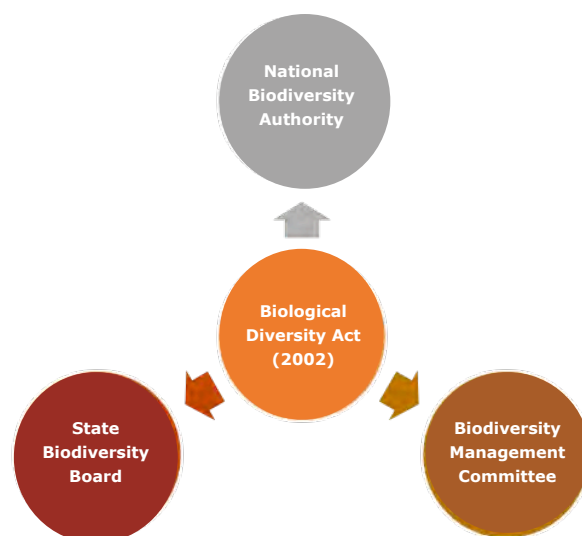
# People's Biodiversity Register in India: Its genesis, significance, and way forward

India is rich in biological diversity, associated traditional and contemporary knowledge. It occupies 2.4% of the world's geographical area that accounts 7–8% of recorded species of global biodiversity (Singh 2016). So far, more than 91,200 animal and 45,500 plant species have been documented in the country (NBA 2018). As a signatory to the Convention on Biological Diversity (CBD) in 1992, the Government of India enacted the Biological Diversity Act (BDA) in 2002 and Rules in 2004 in the country. CBD mandates to conserve biological diversity, sustainable use and fair and equitable sharing of the benefits arising out of utilization of natural resources.

Notably, the Convention confirms sovereign rights of the states for their biological diversity. Under the Convention, it is mandatory for each member state to prepare a National Biodiversity Strategy and Action Plan (NBSAP) or an equivalent tool for the conservation of biodiversity. Therefore, the National Biodiversity Authority (NBA) was established under the BDA (2002) to provide guidance and technical support to the Biodiversity Management Committee (BMC) for the preparation of People's Biodiversity Register (PBR) (NBA 2013). The implementation of BDA (2002) has been carried out at three-tier levels, viz.: NBA at National level, State Biodiversity Board (SBB) at State level and BMCs at Gram Panchayat level (NBA 2004; Figure 1). In the country, some of the state governments such as Haryana, Kerala have nominated Panchayati Raj Institution (PRI) or

Municipal Corporation as the nodal department for the constitution of BMCs. Additionally, SBBs and State Forest Departments are mainly engaged in the implementation of the BDA (2002) through enacting their own state specific biodiversity rules in majority of the states. It has been realized that involvement of the PRI in the implementation does ensure a complete synergy between different line departments that is all more necessary both in the conservation of the biodiversity and documentation of the PBRs.

The main aim of constitution of BMCs vis-à-vis PBRs preparation is to create awareness and develop relationship among people with their environment (NBA 2004). Notably, as of January 2022, the country has supported the creation of 2,65,458 PBRs and 2,76,690 BMCs by the respective SBBs across 28 states and eight Union Territories ([www.nbaindia.org](http://www.nbaindia.org)).



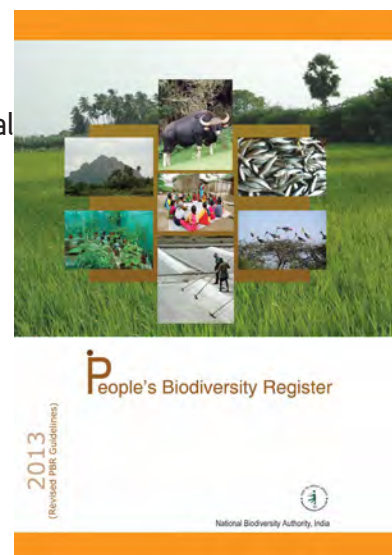
**Figure 1. Three-tier implementation of Biological Diversity Act (2002) in India.**



As per Biological Diversity Rules (2004), it is mandatory for the BMC of every local body to prepare a PBR. A PBR is a legal document which contains information about the complete biodiversity of an area, viz., flora, fauna and other natural resources under the jurisdiction of a BMC in a prescribed format as per the guidelines of the NBA. As per the revised PBR guidelines of NBA (2013), a PBR booklet constitutes five Annexures including general details on BMC of the panchayat; list of 'vaid', 'hakims' and local traditional health care practitioners residing and or using biological resources occurring within the jurisdiction of the village; list of individuals perceived by the villagers to possess Traditional Knowledge (TK) related to biodiversity in agriculture, fisheries, and forestry; list of schools, colleges, departments, universities, government institutions, non-governmental organization and individuals involved in the preparation of the PBR and details of access to biological resources and TK granted, details of the collection fee imposed and details of the benefits derived and the mode of their sharing. Subsequently, the detailed information on agro-biodiversity, viz., crop plants, fruit plants, fodder plants, weeds, pests of crops, markets for domesticated animals, people scape, landscape, waterscape, and soil type (format 1–10), domesticated biodiversity, viz., fruit trees, medicinal plants, ornamental plants, timber plants, domesticated animals, culture fisheries and market or fair for domesticated animals, medicinal plants and other products (format 11–17), wild biodiversity, viz., trees, shrubs, herbs, tubers, grasses, climbers etc, wild plant species of importance, aquatic biodiversity, wild aquatic plant species of importance, wild plants of medicinal

importance, wild relatives of crops, ornamental plants, fumigate or chewing plants, timber plants, coastal and marine flora, coastal and marine fauna and wild animals (format 18–28),

and urban biodiversity, viz., flora, fauna and any other information of local importance (format 29–31) have to be filled in PBRs (NBA 2013). Notably, the documentation of PBR involves sound understating of both technical knowledge on natural resources and more importantly an art to involve different stakeholders to create awareness and ownership on biodiversity and its conservation. Moreover, the documentation of PBR is an attempt to support traditional knowledge and wisdom by creating more formal institutions for their maintenance and more importantly by creating new context for their continued practice (Gadgil et al. 1993, 2000). The information recorded in a PBR is also collected using Participatory Rural Appraisal (PRA) (Chambers 1992) which fulfills the aim of decentralized participatory systems of resource management (Chambers 1983). The PBR process also helps to record and promote an assessment of a variety of conservation oriented traditional resources and practices (Gadgil & Berkes 1991). PBR emphasizes this documentation as a tool to empower people outside the scientific, administrative, and political mainstream (Sharma 1997). Therefore, a team of personnel having expertise





of technical and social aspects is important for the preparation of PBRs. Knowledge on conducting surveys, organizing meetings and workshops and interacting with the local people preferably in local language holds much importance in PBR preparation.

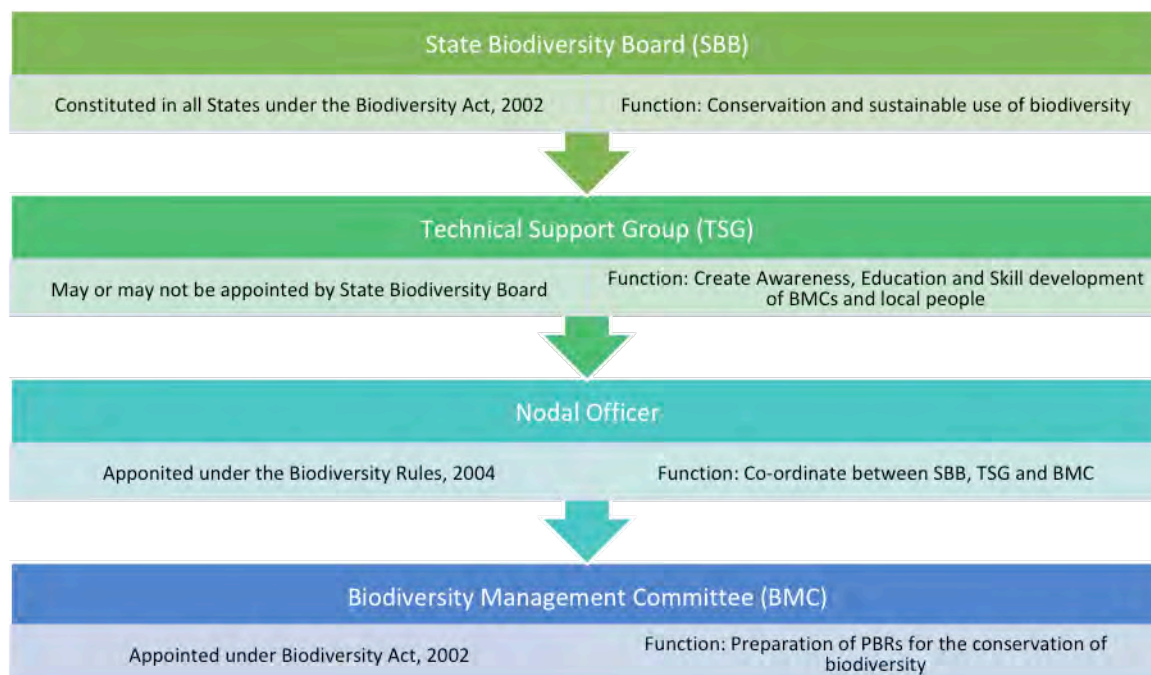
It is essential that a proficient team is engaged into this process having mix of personnel's such as sociologists, field botanists, ecologists, agriculturists, horticulturists, and zoologists having experience of conducting training workshops, sensitization programs, conducting field surveys, and collection and collation of secondary information. Most importantly, deep understanding on the basic concepts of biodiversity conservation and Biodiversity Act and Rules (NBA 2004) in general; NBA guidelines on the PBR preparation including different formats (NBA 2013); processes involved in collection of secondary information on different components such as, flora, fauna, and other natural resources including browsing official websites to extract all existing information about a region specifically would necessarily form a firm basis to prepare a quality PBR. Subsequently, series of discussions among all team members is a must to bring them all on a same page to understand different ground level issues and to prepare strategies for undertaking the tasks. Time to time correspondences via email, telephone, and other electronic means with SBB, concerned nodal officers, chairman and members of BMCs is also important while undertaking field excursions and conducting training workshops of locals to collect quality data on available natural resources.

The awareness cum PBR documentation trainings include sensitization of the BMC

chairperson and its members including locals about the Biodiversity Act (2002) & Rules (2004) along with access and benefit sharing (ABS) mechanism, Protected Areas, heritage sites, and conservation and promotion of biodiversity in their respective areas of jurisdiction. Additionally, it should also appraise BMCs about maintenance of cash book, accounts, and meeting's registers. One important function of the BMCs is to periodically hold meetings for updates on the activities undertaken towards meeting objectives of the BDA and in identification and collection of data on biological resources and traditional knowledge for the purpose of documentation of the PBRs. The training should ensure participation of nodal officer, chairman & members of BMCs, gram panchayat sarpanch (pradhan) & gram panchayat secretary (sachiv), one representative from the line departments, viz., agriculture, fishery, horticulture, and animal husbandry along with representatives of local school, college, university, and non-government organizations of the concerned block or panchayat.

It is important to note that traditional model of conducting training workshop doesn't yield desired outputs. Whereas, more one-on-one interactions with the stakeholders during the technical sessions splitting them into 4–5 smaller groups having a maximum 7–8 participants from different domains of their roles, tasks, and expertise including gender representations works effectively. Here, each member in the group gets opportunity to present his or her views and also each sub-group are encouraged for more effective and participatory outputs during the training workshops. It has been experienced that audio-





**Figure 2. Hierarchical representation of organizations under BDA, 2002.**

visual means such as, films, documentaries, power-point presentations preferably in local language and use of local examples of respective panchayat or block or district which can be understood and owned by locals for future use, prove more effective in making BMC members and local villagers understand the matter in question.

As the main objective of the PBR stands at recording and enlisting meticulously all available natural resources, it poses a big challenge while interacting with the locals and other stakeholders especially when the local residents are not aware of what constitutes a 'natural bio-resource'. The weeds in their agriculture fields are not a species to be bothered for them as a natural resource due to its harmful effects on their crops, though, it might have medicinal properties and thus meriting as a 'natural bio-resource' worth recording and enlisting in the PBR. Therefore, identification and enlisting of

biological resources along with information on traditional knowledge with the participation of BMC members and locals constitutes a very important component in the entire process of the documentation of PBR. It is thus, attempted as a process to record and enlist every conceivable natural resource including landscapes, peoplescapes, soil, water bodies, etc. lying within the perimeter of a given panchayat. Most importantly, the locals and BMC members should understand, appreciate and get convinced as to why certain 'resources' are being recorded in the register. It is also very essential that the traditional knowledge associated with the use of various resources is also recorded without infringing their rights to withhold such information as the locals would not like to disclose, however in due course it could be made to understand the importance of such knowledge to get converted as IPR or patenting. In order to record any natural resource, it is also important to understand the uniqueness of some of the features that



could be later declared as 'heritage site' or site of ecological importance. Thus, the BMC members and locals should also get aware about the importance of declaring certain features within their panchayat jurisdiction as 'heritage sites'.

As is evident from the PBR formats, it has not only to record wild flora and fauna but also other natural resources such as wild and domesticated species. Therefore, to collect this information, it is very important that during the awareness meetings and training workshops, the participation of the officials of line departments is also ensured. It is often observed that PBR documentation is considered the sole responsibility of SBB and therefore, the officials of many line departments related with natural resource management does not take keen interest in PBR process. The first step is to make them aware about their roles into the entire process through frequent meetings, dialogues, and official communications.

The role of line departments is crucial during collection of primary data and secondary data as they are the repositories of data and information pertaining to their field of expertise and facts on such resources. Documentation of the PBR by collecting first-hand information, i.e., primary data through interactions with the villagers, BMC members and other stakeholder constitute a mandatory part of the PBR documentation process, yet, secondary information has its own importance, that, if not adhered to, shall render the documentation process incomplete. While primary data collection provides details on current position of resources with little bit of historical aspects through verbal accounts of

older people in the panchayat jurisdiction, the secondary information provides much needed historical and time-series accounts on various aspects pertaining to given panchayat, which is scientifically documented and authenticated as well in the form of report, scientific research papers, books on flora and fauna and government records etc. Therefore, extensive review of literature is the most important process of PBR documentation and need be taken comprehensively to enlist all available secondary records (both directly and indirectly) pertaining to given panchayat jurisdiction. Field data collection helps in actual interactions with the villagers besides taking photographic and video-graphic documentation of the available natural resources. It is the backbone of the entire process of PBR documentation and the quality of a PBR gets determined how effectively field data collection is executed in an area. After the proper identification of natural resources, it calls to ensure that all the information has been properly documented using the formats as per the NBA guidelines. For this, it is necessary that each and every column is understood correctly to ensure that each entry reflects upon the given resources in all its properties, usage, local names, scientific names, traditional usage, quantity, types, traditional versus hybrid varieties etc. In small group (5–6 people) interactions with the BMC members and local villagers, it has to be ensured that each format and each column within the formats are explained clearly. This also mandates listening to their 'versions' based on their understanding and then filtering and refining their statements and information to select more accurate and 'directly-related-versions' for the purpose of given format and column therein. The strategy of small group



discussions, one-on-one discussions with key members such as aged residents of a given panchayat, traditional healers (vaidya), women folks and household discussions prove very successful in collecting primary information during field data collection. Further, correct identification of plant species (agriculture, horticulture, and forestry) with the help of locals holds importance in PBR exercise.

Due to inherent process of documentation of the PBR, which is by the people, of the people and for the people, there arise a need to validate the collected information both primary and secondary data to ensure that the correct references from where data or information has been collected is quoted in the PBR. The SBBs has a mandate to constitute Expert Committees (ECs) at the district and block levels consisting of experts from different domains of knowledge that are likely to be documented in the PBR.

The main task of the ECs is to ensure the quality PBRs in terms of the scrutiny of scientific testimonies, especially into the matters of scientific names, correctness in the distribution regime of certain species, their usages etc. In most cases, the entire process of PBR documentation by the BMCs is facilitated through the engagement of various Technical Support Groups (TSGs) who are institutions of repute in the field of natural resource management, PRA, social interactions, conduct of meetings and training workshops at the ground level and experience in facilitation of PBR documentation. Hence, the documented PBRs prepared by BMCs along with the technical support of TSGs are placed with the ECs for its validation in presence of both the

TSGs and BMCs. The suggested amends, if any by the TSGs are incorporated in the final PBR, which are then authenticated and certified by the given BMC. This is a very important step to ensure that the PBR is a legally, technically, and scientifically correct document and thus could withstand the legal scrutiny of legal processes, if any such situation arises. Thus, EC and TSG help in analyzing and verifying the documented data in PBR.

Hence, it is concluded that individual interactions as well as group discussions with the members of BMCs and local villagers, especially the senior citizens who are repository of historical knowledge on varied natural resources and their utilization and both internal and external impacts leading to current status, play a very important role in creating awareness on the importance of conservation of local biodiversity. Subsequently, frequent field excursions and interactions with local inhabitants prove helpful for the better understanding and creating sense of ownership among the members of the BMCs and the villagers. Further, photographic documentation and audio & video clips on flora, fauna and other natural resources must be undertaken as an integral part of PBR documentation process to act as documentary proofs, not only during the validation processes of the PBR, but also as an authentic baseline information for future records. Given that the PBR is a dynamic document, involvement of regional or local institutions is a must to sustain periodic updating efforts of the PBR. Sensitization of youth and school children is also essential for the biodiversity conservation as future sentinels. Similarly, existing institutions such as Joint Forest Management Committees,



Eco-development Committees etc. involved in managing forests, wildlife, and other natural resources at the village or block or district levels must also be involved in PBR documentation, which may add to various new features to the documented PBR besides adding the varied management options (SPWD 1992; Saxena 1999). Notably, it needs to be understood that the PBR documentation process is very different from conducting scientific surveys on natural resources by individual researchers or by various research and academic institutions, both in its intent and outputs.

The data and information (past and present) captured in the PBR through people's own versions are very different than normal scientific surveys as people's versions are intertwined and blended with their cultural, ecological, social nuances and complexions, which is the real intent of PBR documentation. Further, validation of PBR through expert groups helps in blending people's version with authenticated scientific data or information to make given PBR a holistic document on an extended timescale and provisions of future updating keeps it afloat to imbibe and stand to contemporary proviso. Therefore, a detailed insight into the purposefully documented PBR for a given area might help unfold the entire spectrum and range of historical and current perspectives on natural resource management. It may not be an exaggeration to equate a PBR with overall natural resource conservation paradigm for the given area, whose purposeful usefulness lies in settling and meeting social, cultural, economic, and ecological needs & issues.

## References

- Chambers, R. (1983).** *Rural Development: Putting the Last First*. Longman, London.
- Chambers, R. (1992).** Rural appraisal: rapid, relaxed and participatory. Discussed Paper #311, Institute of Development Studies, Sussex, UK.
- Gadgil, M. & F. Berkes (1991).** Traditional resource management systems. *Resource Management and Optimisation* 18(3–4): 27–141.
- Gadgil, M., F. Berkes & C. Folke (1993).** Indigenous knowledge for biodiversity conservation. *Ambio* 22: 151–156
- Gadgil, M., P.R.S. Rao, G. Utkarsh, P. Pramod, A. Chhatre & members of the People's Biodiversity Initiative (2000).** New meanings for old knowledge: The People's Biodiversity Registers Program. *Ecological Applications* 10(5): 1307–1317.
- NBA (2004).** *The Biological Diversity Act, 2002 and Biological Diversity Rules, 2004*. Nandi Offset Printers, Chennai, Tamil Nadu, India, 74 pp.
- NBA (2013).** *Revised People's Biodiversity Register Guidelines 2013*. National Biodiversity Authority, Chennai, Tamil Nadu, India, 60 pp.
- NBA (2018).** *Annual Report 2017–18*. National Biodiversity Authority, Chennai, Tamil Nadu, India, 91 pp.
- Saxena, N.C. (1999).** *The Saga of Participatory Forest Management in India*. Centre for International Forestry Research, Jakarta, Indonesia, 214 pp.
- Sharma, B.D. (1997).** *Tide Turned: The Making of Tribals Self-Rule in the First Central Law in the wake of Bhuria Committee Report*. Sahyog Pustak Kutir, New Delhi, 44 pp.
- Singh, R. (2016).** Recent trends and current status of biodiversity conservation strategies in India. *Advances in Bio and Medico Sciences* 36–56.
- SPWD (1992).** *Joint Forest Management Field Methods Manual*. Society for Promotion of Wasteland Development, Vol. 1 & 2, New Delhi.

**Amit Kumar<sup>1</sup>, Pallavi Vishnoi<sup>2</sup> & Atul Kumar Gupta<sup>3</sup>**

<sup>1,2,3</sup>Wildlife Institute of India, Dehradun 248002 Uttarakhand, India. Email: <sup>1</sup>amit@wii.gov.in

Citation: **Kumar, A., P. Vishnoi & A.K. Gupta (2022).** People's Biodiversity Register in India: Its genesis, significance, and way forward. *Zoo's Print* 37(3): 03–09.



# Deviant death of elephants in agrarian landscapes in southern Bengal

The Asian Elephant *Elephas maximus*, a long-ranging social animal, has been severely affected by habitat alteration caused by anthropogenic activities. Due to habitat loss, these animals have been forced to move through human-dominated landscapes in order to meet their extensive dietary requirements, resulting in negative human-elephant interactions (Naha et al. 2019).

In contrast, there has been very little elephant migration in southern Bengal over the last century. The migration of elephants started from the Dalma range in Jharkhand to southern Bengal in the 1960s and 70s. Previously, they spent very little time in Mayurjharna Elephant Reserve; it was mostly a seasonal migration. Another major reason for the change in the movement was the forest degradation in the Mayurjharna Elephant Reserve that necessitated their range expansion in southern Bengal.

The study reported that the distribution range of elephants from central India to southern Bengal has expanded from 1,200 sq.km in the 1950s to 13,200 sq.km by 2010–18 (Kumara et al. 2019). The expansion of their distribution range is happening in the agrarian landscape of southern Bengal despite the dearth of continuous forests. In the last 20 years, as the number of elephants increased



The carcasses of the elephant were found at Belboni, Bankura on 07 March 2022 (top) and on 12 March 2022 (bottom).  
© Susanta Basani

yearly, a few of them became residential in the Bankura North Division. After crossing the Damodar River, elephants have begun to move towards Purba and Paschim Bardhaman in the last few years.

The forest areas of Bankura North Division are home to two types of elephants: residential elephants and non-residential elephants.



When most of the elephant herds migrate from Panchet Division to Bankura North Division (particularly the Barjora and Beliatore ranges), the residential elephants revert to the Bankura North Range. The forest department uses electrically-charged fencing to keep elephants in certain areas of the district. However, the fencing (which employs a battery system) delivers a low-power shock to the elephant. Some people are illegally hooking up power lines with high-voltage electric wire and fencing their cropland. It could be 220V, 440V, or 11,000V. This type of practice is becoming more common among farmers in southern Bengal, an area known for elephant movement.

Kumara et al. (2019) reported a number of unnatural deaths in the period between June 2013 and February 2017. Eight elephants died as a result of electrocution, five of which were from Bankura North Division. In addition, 10 elephants died in retaliatory killings simultaneously. Nine of the 10 deaths occurred in the Bankura North Division. However, between 2010 and 2018, there were 268 human deaths caused by elephants, and 372 people were injured (Kumara et al. 2019). In Bankura North Division, 42 people were killed and 72 were injured by elephants. The intensity of intolerance at the human-elephant interface has been perceived to have increased in recent times in the region. Many of the farmers have small, marginal plots of land. They face crop destruction or loss due to the elephants' movements. In such circumstances, human-elephant interfaces are likely to have resulted in the retaliatory killing and electrocution

of elephants. Electrocution has become widely known as an effective means to kill elephants. It is a common practice reported from other parts of India (Sukumar 1989; Gubbi 2009). The most recent two incidents occurred at the Bankura North Range of the Bankura North Division, where potatoes and wheat are now the major crops grown during winter.

On 12 March 2022 (Saturday), a fully grown adult male elephant carcass was recovered from a village in Bankura North Division, the third such incident in southern Bengal in 10 days. The elephant appeared to have died after being electrocuted by a live wire wrapped around in a crop field at Belboni Beat. It is most likely a person's private farm that is fenced with high-voltage electric wires. However, further confirmation is required to support the claim. Only the elephant's front trunk has some burnt marks and the wounded area suggests that the elephant died as a result of an electric fence (Image 1a). Five days ago, on 7 March 2022 (Monday), a tusker from the same area died in a similar manner (Image 1b). A notice given on 14 March 2022 indicates that the Bankura North Forest Department arrested a person from Belboni under the Wildlife (Protection) Act, 1972. When he was produced in Bankura court, the judge granted him 14 days of judicial custody (Bankura North Forest Division, 2022).

The increased number of elephants, as well as their constant movement between remnant forest patches and agricultural fields, adds to the human-elephant interfaces. It





has lowered the level of tolerance among the locals. People who lived in these areas a century ago were not accustomed to live alongside elephants. In contrast to other parts of India where elephants have been present for a long time, the people in this region are linked to elephants in both sociocultural and ecological aspects. Therefore, a greater emphasis on public education in the ecological and sociocultural aspects of life in southern Bengal is highly required through an interdisciplinary approach.

A large-scale awareness programme for farmers and local people in high-conflict areas, as well as immediate attention by the forest department to conflict issues, would help to restore local people's trust in the management. Despite having very little manpower to respond to such incidents in a timely manner, the forest department is doing their best. The government of West Bengal should concentrate its efforts in areas where elephants are known to congregate. More personnel should be assigned to the forest department in order to build a bridge of communication between them and the local residents. The information about the daily movement of elephants must be more widely disseminated at the village level, particularly in areas where residential elephants reside.

**Acknowledgements:** We are also grateful to Dr. Sanjay Molur, Dr. Arijit Pal, Ms. Sarmistha Ojha and Mr. Supriya Samanta for their insightful discussions on the subject, as well as all members of the Green Plateau Organization for their continuous support.

## References

- Bankura North Forest Division, Government of West Bengal (বাঁকুড়া উত্তর বন বিভাগ, পশ্চিমবঙ্গ সরকার) (2022, March 14).** The official Facebook Page of Bankura District Forest. <https://www.facebook.com/382375635180774/posts/488746338005252/?sfnsn=wiwspwa>
- Gubbi, S. (2009).** Elephant deaths due to electrocution: a consequence of inappropriate habitat management? *Oryx* 43: 323–324.
- Kumara, H.N., P.A. Azeez & A. Singh (2019).** Ecology of elephant (*Elephas maximus*) in South-West Bengal including population dynamics, migratory pattern, feeding habits and human-elephant conflict. Project Final Report (SACON Report No. PR – 203). Submitted to West Bengal Forest and Biodiversity Conservation Society-Kolkata.
- Naha, D., S. Sathyakumar, S. Dash, A. Chettri & G.S. Rawat (2019).** Assessment and prediction of spatial patterns of human-elephant conflicts in changing land cover scenarios of a human-dominated landscape in North Bengal. *PLoS One* 14(2): e0210580.
- Sukumar, R. (1989).** Ecology of the Asian Elephant in southern India. I. Movement and habitat 725 utilization patterns. *Journal of Tropical Ecology* 5: 1–18.
- Santanu Mahato<sup>1</sup>, Aritri Chatterjee<sup>2</sup> & Susanta Basani<sup>3</sup>**  
<sup>1-3</sup>Green Plateau Organization, Hatirampur, Bankura, West Bengal 722121, India  
<sup>1</sup>Biopsychology Laboratory, Institution of Excellence, University of Mysore, Mysuru, Karnataka 570006, India  
Email: <sup>1</sup>santanumahato94@gmail.com (corresponding author)

**Citation:** Mahato, S., A. Chatterjee & S. Basani (2022). Deviant death of elephants in agrarian landscapes in southern Bengal. *Human-Animal Interaction #1*, In: *Zoo's Print* 37(3): 10–12.



## ***Road kills of wild animals – the ignored human-animal interface***

In India, the impact of roads and traffic on wildlife has gained less research attention, except for a few studies that focus on road kills (Gubbi et al. 2012). The increase in construction of new roads and use of these roads can constitute many threats to wildlife including mortality resulting from collisions with moving vehicles (Teixeira et al. 2015).

Roads result in habitat loss and act as barriers to animal movement and direct mortality especially in fragmented landscapes (Grift et al. 2015). Did you know there are 64 million km of roads currently in excess on Earth which is enough for 83 round-trips to the moon (Ree 2015)? Important regions for biodiversity have extensive road networks (Ree 2015). Increased industrialization, population, and change in lifestyle are the reasons for the construction of new roads that continues to increase in rapid speed, especially in developing countries.

In spite of the speed limit boards put up next to roads, how often do we follow the rules and regulations? There should be some kind of monitoring system in place especially with respect to high bio-diverse regions in both protected and non-protected areas where there is frequent movement of wild animals. We need more research and citizen science can be an option to record all the information on wildlife that citizens encounter during their travel to different places.

The ecological and environmental impacts of roads are less known and are considered least priority in most of the developing countries. During a symposium, conservation at the cross-roads: ICCB–ECCB in 2015, a survey of ~600 practitioners was conducted globally, as well as insights were derived from the “Handbook of Road Ecology”, published in 2015. This handbook contains 62 chapters, written by over 100 authors from 25 countries



**Roadkill image of Small Indian Civet with speed limit signage of 65 km/hr**





focused on six key recommendations including important areas for biodiversity to be spared from road construction to ensure research data to be made widely available to conduct meta-analyses of such data. The need to build a more-sustainable global road network and implement effective evaluation of mitigation is the need of the hour (Ree 2015).

## Encounters with wildlife road kill in Kollegala and Hanur taluk

### Small Indian Civet *Viverricula indica* IUCN Red List: Least Concern

#### Encounter 1

Date: 02 January 2021; Time: 1600 h;  
Place: Chamarajanagara to Tirumakudalu-Narasipura highway.

Two road kills of Small Indian Civets were noticed and the distance between them was less than 10 m. One was found dead in the middle of the road and the other on the side of the road. The road is well maintained as there is toll system in place and the vehicles travel at a speed more than the speed limit signage of 65 km/hr.

#### Encounter 2:

Date: 09 January 2021; Time: 1000 h; Place: Hanur to Ajjipura road.

One road kill of Small Indian Civet roadkill was noticed near Arakanahalla which passes through MM Hills Wildlife Sanctuary. Information was provided to the forest department.



Roadkill image of a Small Indian Civet with close proximity with another individual



Roadkill image of a Small Indian Civet





Head & body length 51 cm; Tail 46 cm;  
Weight 3.5 kg



Roadkill image of a Small Indian Civet

### Encounter 3:

Date: 28 February 2022; Time: 1612 h; Place:  
Mysore to Kollegala road.

One individual road kill of Small Indian Civet was noticed near Tagarupura surrounded by agriculture land and paddy fields.

### Rusty Spotted Cat *Prionailurus rubiginosus*

**IUCN Red List: Near Threatened**

### Encounter 4:

Date: 09 December 2020; Time: 1830 h;  
Place: Hanur to MM Hills temple road.



An old roadkill image of a Small Indian Civet

One individual road kill of the smallest cat in the world was noticed just 2 km from Cowdalli to MM Hills temple road on the side almost 10 m from the sign board that says 'Wildlife Crossing Please Go Slowly', which also passes through MM Hills Wildlife Sanctuary. Information was provided to the forest department.

Head & body length 34 cm; Tail 24.5 cm;  
Hind leg height 15 cm; Height 25 cm.





Roadkill image of a Rusty Spotted Cat at dusk.



The prominent three lines on the head of the Rusty Spotted Cat.

## References:

**Grift, E., M. Huijser & C. Rosell (2015).** Mitigating the negative effects of roads and traffic on wildlife: how effective are our strategies? Report of Conservation at the cross-roads: ICCB-ECCB Symposium, 15 pp.

**Teixeira, F.Z., K.E. Gunson & C. Visintin (2015).** Evaluating when and where to implement road mitigation for wildlife with roadkill modelling: three international case studies. Report of Conservation at the cross-roads: ICCB-ECCB Symposium, 09 pp.

**Ree, R. (2015).** The road ahead – the future of road ecology in a rapidly changing world. Report of Conservation at the cross-roads: ICCB-ECCB Symposium, 15 pp.

**Gubbi, S., H.C. Poornesha & M.D. Madhusudan (2012).** Impact of vehicular traffic on the use of highway edges by large mammals in a South Indian wildlife reserve. *Current Science* 102(7): 1047–1051.

**Acknowledgements:** Dr. Sanjay Gubbi, H.C. Poornesha, Kiran Prabhu, Santhosh Kumar (alumni), David Kumar, and N. Ganesh (Nature Conservation Foundation, Western Ghats Program) for all their support and guidance.

## Ashritha Anoop

Project Coordinator, Nature Conservation Foundation (Western Ghats Program), Hanur Taluk, Chamarajanagar District, Karnataka 571439, India. RHATC Fellow 2021–22 (alumni) Email: ashrittha@ncf-india.org

**Citation:** Anoop, A. (2022). Road kills of wild animals - the ignored human-animal interface. *Human-Animal Interaction* #1, In: *Zoo's Print* 37(3): 13–16.

# A record of Tricolour Sharkminnow from southern India: an addition to the introduced fish fauna of the river Cauvery.

The proliferation of exotic or introduced species is a major global problem. This problem is further complicated in freshwater habitats, where the scale of fish invasions and their impacts are hard to track, due to practical difficulties in monitoring fishes. Fishes get introduced intentionally or accidentally via various methods such as commercial aquaculture, release of ornamental species, bioremediation and sometimes through live release from traditional religious practices (Everard et al. 2019). Approximately 5,300 species of freshwater fish (Novák et al. 2020) and 1,802 species of marine fishes are traded



**Tricolor Sharkminnow captured on rod and line at the Malligemaradahalla Lake, Malavalli. The specimen was healthy with no physical deformities. © Ranjeet Singh.**



**Habitat where the specimen was captured. © Bradley N. Demos**



internationally as ornamentals alone (Hensen et al. 2010; Rhyne et al. 2012), making up one-third of the top 100 global invasive species (Knight 2010). In India, the ornamental fish trade is a big business, and the risk of a wide variety of fish escaping into natural water bodies is high. Such intentional or unintentional introductions can lead to the proliferation of non-native species in natural waterbodies.

Direct impacts of alien invasive species include competition for food and territory with native fishes, increased predation pressures in the case of predatory species, introduction of parasitic invertebrates, genetic erosion of indigenous species and socio-economic impacts on fisher communities (Kumar 2000).

So far, not much attention has been given to monitoring fish invasions in the Cauvery River although literature suggests that 17 introduced fish species occur here. This number is likely to be much higher given the lack of literature available on the subject and limitations in field identification of fish. The handful of studies that are available, suggest that 11 of these species occur in the middle reaches of the river (Muralidharan et al. 2016; Sreenivasan et al. 2021).

In the Shivanasamudram Fish Sanctuary and the Cauvery Wildlife Sanctuary, these account for 17% of the documented species. Other studies in the lower reaches of the river report the presence of the Giant Gourami *Osphronemus goramy* and Mosquito Fish *Gambusia affinis*, that were

introduced to the Stanley Reservoir in the 1940's (Chacko et al. 1955). The Three-spot Cichlid *Amphilophus trimaculatus* (Kumar et al. 2021) and Dwarf Gourami *Trichogaster lalius* (Ramya et al. 2019) are two other species that have been reported from the lower reaches of the Cauvery. The African Sharptooth Catfish *Clarias gariepinus*, the world's most successful aquatic invader (Booth et al. 2010), is now widely distributed in the Cauvery system. Perhaps the most profound socio-economic impact of this invasive species is felt by fishermen who complain that their previous species-rich catch is now mostly comprised of *C. gariepinus*. Another invasive species, Nile Tilapia *Oreochromis niloticus* are found along the entire length of the Cauvery River. Their nesting pits are often visible along sandy banks as the river recedes. Then, there are the three Indian major Carps *Labeo catla*, *Labeo rohita* & *Cirrhinus mrigala*, Grass Carp *Ctenopharyngodon idella* and Common Carp *Cyprinus carpio* that are routinely stocked in the basin to support commercial fisheries. Below is an account of a new addition to the list of introduced species in the Cauvery River.

The Tricolour Sharkminnow *Balantiocheilos melanopterus* (Bleeker, 1850) is highly valued in the ornamental fish trade. The species is native to several countries including Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Thailand, and Vietnam (Acosta & Gupta 2005). However, a high demand for live caught specimens has led to the overharvest and subsequent extinction of

*B. melanopterus* from most of its distribution range (Baras et al. 2007). The species is commonly found in the world's aquarium market under the trade name, 'Bala shark' or 'Silver shark'.

On 12 October 2020, an adult specimen of *B. melanopterus* was captured at a recreational 'catch and release' fishery site near Shivanasamudram, Karnataka (12.3° N, 77.144° E). The collected specimen is likely to have escaped from aquaria or might have been intentionally released by a hobbyist. The fish was captured by a member of the Wildlife Association of south India, Mr. Ranjeet Singh while angling with a plant-based bait on a spring-feeder rig. The specimen measured 37.8 cm in standard length, it was photographed and released alive at the site of capture. The specimen was observed to be vigorous and healthy with no deformities. Angling guides working at the campsite for over 10 years, confirmed that they had not come across this species before.

It is important to monitor introduced species to understand patterns in their behaviour, distribution, and abundance. Apart from monitoring, there is also a need to carry out education programmes. Such campaigns will educate and sensitize hobbyists, anglers, or religious institutions to conservation issues. This current record of *B. melanopterus* from Cauvery, is a reminder for the need to employ strong legislations to regulate the import, propagation, and transport of non-native fishes in India. It also draws attention to the possibility of exploring the logistic potential

of angling community in the country to scientifically document fish diversity in a cost-effective manner. Given the right engagement between anglers, fishers, scientists, and conservationists, an opportunity to establish a citizen science platform could be explored to crowd source and manage data on the diversity and distribution of freshwater fishes in India.

#### References

- Acosta, B.O. & M.V. Gupta (2005).** Threatened cyprinid species in Asia, pp. 138–145. In: Penman, D.J., M.V. Gupta & M.M. Dey (eds.) *Carp Genetic resources for Aquaculture in Asia*. WorldFish Center Technical Report 65. Penang, Malaysia
- Baras, E., A. Priyadi & M. Legendre (2007).** Ontogeny of the balashark *Balantiocheilos melanopterus* Bleeker, 1851 (Cyprinidae). *Indonesian Aquaculture Journal* 2(1): 59–66.
- Booth, A.J., G.R. Traasg & O.L. Weyl (2010).** Adult African sharptooth catfish, *Clarias gariepinus*, population dynamics in a small invaded warm-temperate impoundment, African Zoology 45(2): 299–308.
- Chacko, P.I., G.K. Kuriyan & S. Thyagarajan (1954 ).** A survey of the fisheries the Cauvery River. Contributions of the Freshwater Fisheries Biological Station, Madras, 12: 1–19.
- Everard, M., A.C. Pinder, R. Raghavan & G. Kataria (2019).** Are well-intended Buddhist practices an under-appreciated threat to global aquatic biodiversity? *Aquatic Conservation: Marine and Freshwater Ecosystems* 29(1): 136–141.
- Hensen, R.R., A. Ploeg & S.A. Fosså (2010).** Standard names for freshwater fishes in the Ornamental Aquatic Industry. OFI educational publication 5. Ornamental Fish International, Maarssen, The Netherlands, 146 pp.
- Knight, J. (2010).** Invasive ornamental fish: a potential threat to aquatic biodiversity in peninsular India. *Journal of Threatened Taxa* 2(2): 700–704.
- Kumar, A.B. (2000).** Exotic fishes and freshwater fish diversity. *Zoos' Print Journal* 15(11): 363–367.
- Kumar, L., K. Kumari, P. Gogoi, R.K. Manna, R.C. Madayi, S.M. Salim & B.K. Das (2021).** Risk analysis of non-native three-spot cichlid,



*Amphilophus trimaculatus*, in the River Cauvery (India). *Fisheries Management and Ecology* 28(2): 158–166.

**Muralidharan, M., M. Raja, M. Gunasekaran, S. Sundar, B. Ramakrishnan & G. Srinivas (2016).** Ichthyofauna of Dharmapuri Forest Division, Tamil Nadu: Status, threats and management. *Journal of Scientific Transaction in Environment and Technovation* 10(2): 61–67.

**Novák, J., L. Kalous & J. Patoka (2020).** Modern ornamental aquaculture in Europe: early history of freshwater fish imports. *Reviews in Aquaculture* 12(4): 2042–2060.

**Ramya, V.L., S.S. Mol, D.K. Rao, P. Panikkar, M. Karthikeyan, P.K. Jesna & U.K. Sarkar (2019).** New Record of *Trichogaster lalius* (Hamilton, 1822) from Thippagondanahalli Reservoir (Cauvery River Basin). *International Journal of Current Microbial and Applied Sciences* 8(10): 2521–2528.

**Rhyne, A.L., M.F. Tlustý, P.J. Schofield, L. Kaufman, J.A. Morris Jr & A.W. Bruckner (2012).** Revealing the Appetite of the Marine Aquarium Fish Trade: The Volume and Biodiversity of Fish Imported into the United States. *PLoS ONE* 7(5): e35808.

**Sreenivasan, N., N. Mahesh & R. Raghavan (2021).** Freshwater fishes of Cauvery Wildlife Sanctuary, Western Ghats of Karnataka, India. *Journal of Threatened Taxa* 13(1): 17470–17476.

**Acknowledgements:** I thank Ranjeet Singh, Kumar, Mahadeva, and Joseph for reporting this important find. On behalf of the WASI team, I thank all those who continue to meticulously document their fish catches which helps to understand fish assemblages in the Shivanasamudram area. I also thank Dr. J.A. Johnson and Dr. Rahul Kumar for their never-ending support and expertise in fish identification.

**Naren Sreenivasan**

Wildlife Association of south India (WASI), No.19  
Victoria Road, Bengaluru, Karnataka 560047, India.  
[naren.sreen002@gmail.com](mailto:naren.sreen002@gmail.com)

**Citation: Sreenivasan, N. (2022).** A record of Tricolour Sharkminnow from southern India: an addition to the introduced fish fauna of the river Cauvery. *Min #4, In: Zoo's Print* 37(3): 17–20.



## Rat trapping for the dietary protein supplement in northern West Bengal

Rodent meat, as a rich proteins source for humans, has been consumed worldwide (Fiedler 1990). In India, it has been practised widely in the tribal communities of northeastern India, northern India (Singh 2016), western India (Weling 1934; Donde 2015), and southern India (Whitaker & Murali 1988). Due to the taboos, very scanty information has been published on the subject— especially about the indigenous trapping mechanisms, communities practicing it, and the nutritional value of the catch.

I witnessed an incidence of rat trapping in Alipurduar in northern West Bengal. Besides Bengali and Nepali communities, Tea Tribes, Rabha, Garo, and Mechia inhabit this region. On 19 November 2013, I visited a family originally from the Santhal tribe from central India and migrated as labours in tea gardens in Assam during the British era (Sharma 2011). The family had a small rice field with a standing crop at that time. Though paddy was looked healthy, it was infested with rats. Interestingly, at the same time, the family was visited by their distant relatives who were experts in rat hunting. They informed me that it was common among the community residing in northern Bengal and western Assam to travel to their relatives, hunt rats and store or carry the dried meat for later use. On that particular day, I got the opportunity to witness the rat trap setting by an older person. He first inspected the site to set the



**Rat trapped by the traditional device at Alipurduar district. © Sachin Ranade.**

trap as the trap had to be placed on a regular path of rats known as runways.

Rats use well-established runways to carry the paddy seeds to their nest for storage. Such storage and brood chamber have a tunnel system with at least 2–3 openings, some of which can be used during escape when rats are in danger. Moreover, rats have numerous burrows, but tribal trapper could recognize the most frequently used holes from where they raided the paddy field. The trap was built with about a meter long





bamboo stick that anchors in the soil, two small pieces of bamboo sticks –about 20 cm in length and a bamboo string. Nowadays the bamboo string could be replaced by plastic rope as well. Similar traps are known from Arunachal Pradesh and Meghalaya (Thakur et al. 2013). The traps were set in the evening on the runway. The bait was not required as the rat on its way to raid or returning gets trapped in such traps. The catch was collected the next morning by the tribals. The whole animal was roasted, during which its fur was lost, but the skin remained intact. In case of storage, the rats were degutted, dried or smoked, and stored.

The trapping skills fulfil a high protein diet needs of the third world people and control the agriculture pests (Oyarekua & Ketiku 2010; Meyer-Rochow et al. 2016). In contrast, Fiedler (1990) mentioned that the trapping and consumption of rodents do not have the merits of pest control at large scale and possibilities of accident and secondary poisoning of the consumer. However, the local solutions to protect small to medium scale farming need special attention. As organic farming gains popularity, this traditional trapping gear has additional advantages because it does not involve any harmful chemicals and is made up of local cheap organic materials, thus, it seems economical and eco-friendly alternative to chemical rodent pest control.

## References

- Donde, S. (2015). Dhor Katkari: The ecosystem people facing the threat of extinction pp. 1-14 In: Patil, P. (Eds) *Environmental Problems and Sustainable Development*. Swastik Publications, New Delhi, 164 pp.
- Thakur, N.S.A., D.M. Firake & D. Kumar (2013). Indigenous traps for the management of rodent outbreak in North-Eastern Hill Region of India. *Indian Journal of Traditional Knowledge* 12(4): 730–735.
- Meyer-Rochow, V.B., K. Megu & J. Chakraborty (2015). Rats: If you can't beat them eat them (Tricks of the Trade observed among the Adi and other North-East Indian Tribals). *Journal of Ethnobiology and Ethnomedicine* 11: 45.
- Fiedler, L.A. (1990). Rodents as a food source. Proceedings of the Vertebrate Pest Conference, 14(14) UC Agriculture & Natural Resources. <https://escholarship.org/uc/item/0tz9z9wv>
- Oyarekua, M.A. & A.O. Ketiku (2010). The nutrient composition of the African Rat. *Advance Journal of Food Science and Technology* 2(6): 318–324.
- Singh, D.P. (2016). Socio-demographic condition of one of the most marginalised caste in northern India. *Demography India* 45(1&2): 117–130
- Sharma, J. (2011). *Empire's Garden Assam and the making of India*. Duke University Press, USA, 224 pp.
- Weling, A.N. (1934). *The Katkaris: A Sociological Study of an Aboriginal Tribe of the Bombay Presidency*. Bombay Book Depot, 156 pp.
- Whitaker, R. & M. Murali (1988). Rodent control by Irula tribals. *Journal of the Bombay Natural History Society* 85: 263–270.

**Acknowledgements:** Thanks to Mr. Madan Uraw and villagers of the forest-village Rajabhatkhawa, Alipurduar district. Gratitude is expressed towards the Bombay Natural History Society for constant support.

## Sachin Ranade

VCBC, Rajabhatkhawa, Alipurduar- 735227 West Bengal  
Email address: sachinranade@yahoo.com

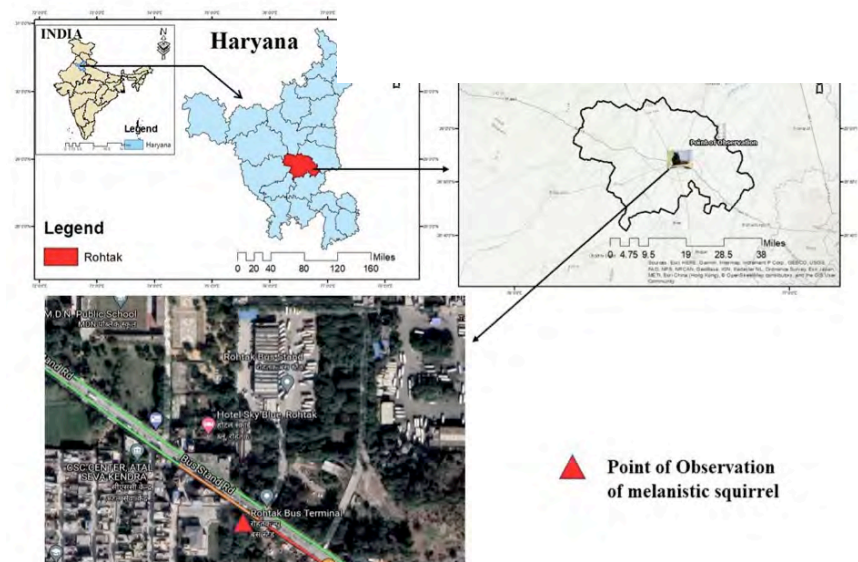
**Citation:** Ranade, S. (2022). Rat trapping for the dietary protein supplement in northern West Bengal. *Small Mammal Mail* #442, In: *Zoo's Print* 37(3): 21–22.



## The rare black Northern Palm Squirrel from Haryana, India

The Northern Palm Squirrel *Funambulus pennantii*, also known as the Five-striped Palm Squirrel, is a small rodent which belongs to the family Sciuridae. It is most commonly found in India and according to the IUCN Red List, its conservation status is Least Concern. The bushy tail and bold stripes running down the body are diagnostic characteristics of this sciurid, which can grow to be 250–270 mm, with 110–120 mm tail length and weigh 60–200 g (Long 2003; DPIPWE 2011). A bushy tail, dark rounded eyes, small triangular ears, and long front teeth distinguish it (Menon 2003; Pradhan & Talmale 2012). It is an omnivore and feeds on a variety of fruits and nuts, as well as eggs, small birds, larvae, and insects (Prasad et al. 1966; Malhi & Kaur 1994; Malhi & Khushrupinder 1995).

Melanism is the reverse of albinism, in which the dark-colored pigment melanin is produced in the skin or its appendages. Because the



**Map showing the location of sighting of the black Northern Palm Squirrel in district Rohtak, Haryana.**

melanistic characteristic is a recessive trait, it is not inherited at random; rather, it is favoured when the gene of two parents are too similar (Ramakrishnan et al. 2016). Animals use colour for a variety of adaptive purposes, including camouflage, signalling, defence, and thermoregulation. Melanism is found in a wide range of animals, and two of its main functions are to provide predatory camouflage, as in lizards to provide protection from predators (Rosenblum et al. 2004) and to provide a thermal advantage in

some organisms such as in butterflies, ladybirds, snails, and snakes (Bittner et al. 2002; Pardo-Diaz et al. 2012).

Few observations were recorded earlier in different states of India. The first spotting of black palm squirrel in Indian subcontinent was scientifically documented by Dileepkumar et al. (2021). They show the colour change is caused by mutation and can be traced back to the melanocortin-1 receptor (MC1R) gene, where it was discovered to be a





(A) Comparison of Northern Palm Squirrel with and without melanism. (B), (C) Comparison of both squirrel in similar food habits © Parul. (D), (E) Black Northern Palm Squirrel sighted at Rohtak (Haryana) © Amit Kumar.

sequence change causing a frame shift in the wild type's extension locus (Dileepkumar et al. 2021). Other spotting of melanism in Indian Giant Flying Squirrel in India was done by Ramakrishnan et al. (2016) at Sathyamangalam Tiger Reserve, Tamil Nadu. A zoology teacher M. Jayashankar had sighted a melanistic squirrel in Devanahalli taluka, a rural district in Bengaluru, Karnataka

(Rupera 2020). Recent sighting of the black coloured Northern Palm Squirrel has been reported in district Vadodara, Gujarat by Karan et al. (2020).

In our photographic documentation, we have described the squirrel as 'black', to which our morph fits in, in accordance with the normal distribution curve for colour possibilities



presented by Singh (1999, 2000) for tiger *Panthera tigris*.

On 24 October 2021, we spotted and photographed a squirrel with fully black coat colour. It was quite a sudden and interesting observation when we were headed mid-way to our homes near the Rohtak District bus-stand. As zoologists and wildlife researchers, we had an idea of its rarity in that locality. Photographic records were taken using Canon Powershot sx70hs camera.

We again surveyed that place on 26 October 2021 and finally spotted the black squirrel and got a good series of photographs. We took coordinates from google maps, observed its feeding activities and noted eatables like biscuits, cooked food, puff corns, coconut etc. Using the coordinates, a map was constructed through Arc GIS 10.8 software showing the point of observation of black squirrel in Haryana.

## References

- Bittner, T.D., R.B. King & J.M. Kerfin (2002).** Effects of body size and melanism on the thermal biology of garter snakes *Thamnophis sirtalis*. *Copeia* (2): 477–482.
- Dileepkumar, R., K. Anaswara, V. Navya, S. Beena, A. Jacob, L. Divya, & O.V. Oommen (2021).** Black Palm Squirrel (*Funambulus palmarum* Linn.) from India: association with a frame shift mutation in the MC1R gene. *Current Science* 121(2): 306.
- DPIIWE (2011).** Pest Risk Assessment: Northern Palm Squirrel *Funambulus pennantii*. Department of Primary Industries, Parks, Water and Environment. Hobart, Tasmania. <https://nre.tas.gov.au/Documents/Northern-Palm-Squirrel-pest-risk-assessment.pdf>
- Karan, R., U. Kartik & S. Azaz (2020).** Record of melanistic Five-striped Squirrel from Vadodara, Gujarat. *Small Mammal Mail* #430, In: *Zoo's Print* 35(11): 1–2.
- Long, J.L. (2003).** Introduced Mammals of the World: Their History, Distribution and Influence. CSIRO Publishing, Victoria, Australia, 589 pp.
- Malhi, C.S. & K. Kaur (1994).** Responses of *Funambulus pennantii* Wroughton (Rodentia, Sciuridae) towards different food additives. *Mammalia* 59: 373–384.
- Malhi, C.S. & K. Khushrupinder (1995).** Food preference behavior of the five striped squirrel, *Funambulus pennanti* Wroughton. *Behavioural Processes* 34: 55–65.
- Menon, V. (2003).** A field guide to Indian mammals. Dorling kindersley (India) Pvt. Ltd. and Penguin Book India (P.) Ltd. Delhi, India.
- Pardo-Diaz, C., C. Salazar, S.W. Baxter, C. Merot, W. Figueiredo-Ready, M. Joron, ... & C.D. Jiggins (2012).** Adaptive introgression across species boundaries in *Heliconius* butterflies. *PLOS Genetics* 8(6): e1002752.
- Pradhan, M.S. & S.S. Talmale (2012).** *Indian Mammals: Checklist with comments on type locality, distribution, conservation, status and taxonomy*. Nature Books India, Kolkata, India, 564 pp.
- Prasad, M.R.N., G.K. Dhaliwal, P. Seth, A.H. Reddi, A.K. Sivashankar & N.K. Uberoi (1966).** Biology of reproduction in the Indian Palm Squirrel, *Funambulus pennanti* (Wroughton). *Symposia of the Zoological Society of London* 15: 353–364.
- Ramakrishnan, B., A. Samson & S. Ramasubramanian (2016).** Observation of melanism in Indian Giant Flying Squirrel *Petaurista philippensis* at Sathyamangalam Tiger Reserve, Tamil Nadu, southern India. *Zoo's Print* 31(9): 8.
- Rupera, P. (2020).** Rare black squirrel spotted in Vadodara. The Times of India. <https://timesofindia.indiatimes.com/city/vadodara/rare-black-squirrel-spotted-in-city/articleshow/76124858.cms>. Accessed on 05 January 2022.
- Rosenblum, E., H. Hoekstra & M. Nachman (2004).** Adaptive reptile colour variation and the evolution of the MC1R gene. *Evolution* 58: 1794–808.
- Singh, L.A.K. (1999).** Born Black: The Melanistic Tiger in India. WWF-India, New Delhi. viii+66 pp
- Singh, L.A.K. (2000).** Colour aberration in Tiger: Its Biological and Conservation Implications. Summary of talk at National Seminar 'Tiger Tiger', 4–5 August, 2000, Indian Museum, Calcutta.

**Amit Kumar<sup>2</sup> Parmesh Kumar<sup>1</sup> Sarita Rana<sup>3</sup> & Parul<sup>2</sup>**

<sup>1</sup> Associate Professor, <sup>2</sup>Assistant Professor, <sup>3</sup>Research Scholar, Department of Zoology, Institute of Integrated and Honors Studies, Kurukshetra University, Kurukshetra, Haryana, India. E-mail: kdamit8@gmail.com (corresponding author)

**Citation:** Kumar, A., P. Kumar, S. Rana & Parul (2022). The rare black Northern Palm Squirrel from Haryana, India. *Small Mammal Mail* #441, In: *Zoo's Print* 37(3): 23–25.



# Bugs R All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)

## Diversity of spider fauna in Sundarvan, Ahmedabad, India

The current world list of spider includes 48,418 species under 4,159 genera and 120 families and India has over 1,700 species belonging to 450 genera under 61 families (World Spider Catalog 2021). The spider diversity of Gujarat consists of 415 species under 169 genera and 40 families. Out of these, 29 genera and 17 families are endemic to Gujarat (Yadav et al. 2017).

The study was conducted from August 2019 till January 2020. Bushes, tree trunks, ground surface, foliage and grasslands were all searched for spiders. Spiders were found in different strata in a habitat, so different methods were applied to study them. Methods which were employed to collect the data included active search following Yadav et al. (2017), vegetation-beating following Sebastian & Peter (2009), and leaf-litter sampling (Yadav et al. 2017).

Live specimens of spiders were photographed using a Canon EOS 80D camera with Canon EF-F 18–135 mm f/3.5–5.6 IS USM lens. Other equipment used as aid to get better photographs were a Photron Stedy Pro 560V tripod and Wipro Emerald Rechargeable LED torch.



**Aerial representation of Sundarvan through maps.**

GPS information was recorded using the GPS status and toolbox application for Android which uses the in-built accelerometer and gyroscope sensors of a modern-day cell phone. The data was later on verified with Google Earth service.

Sundarvan, set in Ahmedabad, Gujarat, India, is a unique facility of the Centre for Environment Education (CEE). This 1.3 ha of land was originally a mango orchard, later converted into a nature discovery centre.

During the study, 46 species were recorded belonging to 31 genera and 14 families. A total number of 105 individuals were recorded. Seven different types of guild structures were also observed.

# Bugs R All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)

## Checklist of spider species recorded during the study.

Family	Scientific Name	Guild	Family	Scientific Name	Guild
Araneidae	<i>Argiope anasuja</i>	Orb Web Weavers	Pholcidae	<i>Crossopriza iyon</i>	Space Web Builders
	<i>Cyclosa</i> sp.	Orb Web Weavers		<i>Pholcidae</i> sp.	Space Web Builders
	<i>Cytophora</i> sp. 1	Orb Web Weavers	Salticidae	<i>Hyllus semicupreus</i>	Stalkers
	<i>Cytophora</i> sp. 2	Orb Web Weavers		<i>Menemerus bivittatus</i>	Stalkers
	<i>Cytophora</i> sp. 3	Orb Web Weavers		<i>Menemerus</i> sp.	Stalkers
	<i>Eriovixia</i> sp. 1	Orb Web Weavers		<i>Phintella</i> sp.	Stalkers
	<i>Eriovixia</i> sp. 2	Orb Web Weavers		<i>Phintelloides</i> sp.	Stalkers
	<i>Larinia</i> sp. 1	Orb Web Weavers		<i>Rudakius</i> sp.	Stalkers
	<i>Neoscona crucifera</i>	Orb Web Weavers		<i>Stenaelurillus</i> sp.	Stalkers
	<i>Neoscona</i> sp. 1	Orb Web Weavers		<i>Thyene imperialis</i>	Stalkers
	<i>Neoscona</i> sp. 2	Orb Web Weavers	Scytodidae	<i>Scytodes</i> sp.	Ground Runners
	<i>Neoscona</i> sp. 3	Orb Web Weavers	Sparassidae	<i>Heteropoda</i> sp.	Foliage Runners
	<i>Neoscona</i> sp. 4	Orb Web Weavers		<i>Olios</i> sp.	Foliage Runners
	<i>Polys</i> sp.	Orb Web Weavers	Tetragnathidae	<i>Guizygiella</i> sp.	Orb Web Weavers
Dictynidae	<i>Nigma</i> sp.	Space Web Builders		<i>Leucauge decorata</i>	Orb Web Weavers
Eresidae	<i>Stegodyphus</i> sp.	Sheet Web Builder	Therididae	<i>Paraseatoda</i> sp.	Space Web Builders
Gnaphosidae	<i>Gnaphosidae</i> sp.	Ground Runners		<i>Rhomphaea</i> sp.	Space Web Builders
Hersiliidae	<i>Hersilia savignyi</i>	Ambush Hunters		<i>Therididae</i> sp.	Space Web Builders
Oxyopidae	<i>Oxyopes biramicus</i>	Ambush Hunters	Thomisidae	<i>Oxytate</i> sp.	Ambush Hunters
	<i>Oxyopes</i> sp. 1	Ambush Hunters		<i>Thomisidae</i> sp.	Ambush Hunters
	<i>Oxyopes</i> sp. 2	Ambush Hunters	Uloboridae	<i>Uloborus plumbeus</i>	Orb Web Weavers
	<i>Oxyopes</i> sp. 3	Ambush Hunters		<i>Uloborus</i> sp.	Orb Web Weavers
	<i>Oxyopes</i> sp. 4	Ambush Hunters		<i>Zosis</i> sp.	Orb Web Weavers

During this study, a total of 105 individuals were observed. Forty-six species were identified which belonged to 31 genera and 14 families. Among the observations, family Araneidae was the most abundant among all. Forty-four individuals (41.9% of the total count) were found from family Araneidae which belonged to seven genera and 14 species. Occurrence of high number of

araneids could be due to mixed vegetation of Sundarvan, which provides enough space to build webs of different sizes. Orb web weavers (19 species, 42%) are the most dominant guild observed. The results show that spider diversity in Sundarvan (which is located in middle of the city) is much higher and more intensive studies may yield more information.

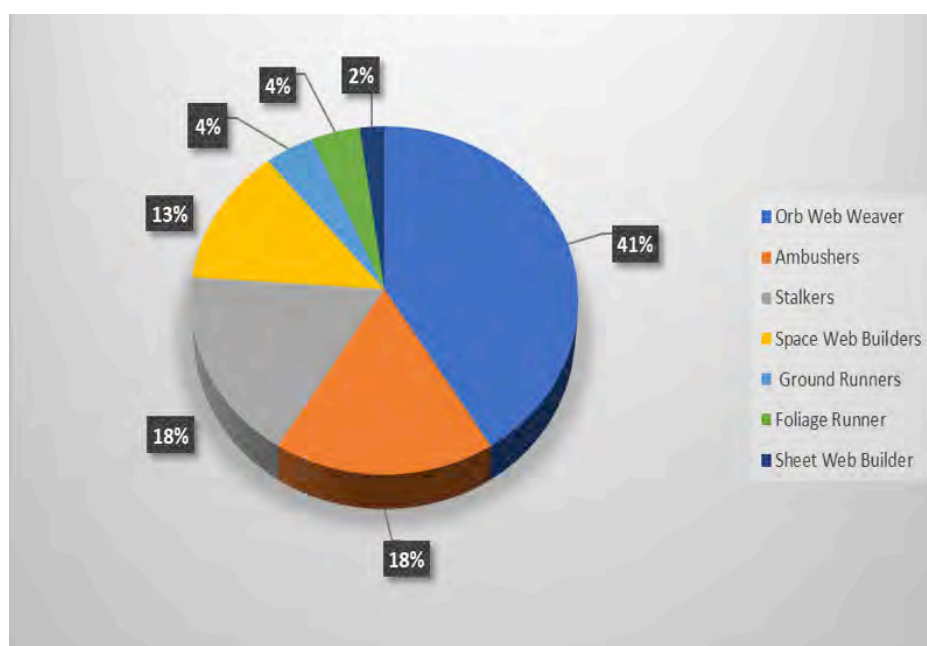


# Bugs R All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)

## Family wise distribution of the number of spiders observed.

	Family	Genera	Species	No. of Individuals
1.	Araneidae	7	14	44
2.	Dictynidae	1	1	1
3.	Eresidae	1	1	1
4.	Gnaphosidae	1	1	1
5.	Hersiliidae	1	1	4
6.	Oxyopidae	1	5	8
7.	Pholicidae	2	2	4
8.	Salticidae	7	8	16
9.	Scytodidae	1	1	4
10.	Sparassidae	2	2	4
11.	Tetragnathidae	2	2	3
12.	Therididae	2	3	5
13.	Thomisidae	1	2	3
14.	Uloboridae	2	3	7
	<b>Total</b>	<b>31</b>	<b>46</b>	<b>105</b>



Composition (%) of guild structure of Spiders from Sundarvan.

# Bugs R All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)



*Leucauge decorata*



*Olios sp.*



*Neoscona sp. 1*



*Scytodes sp.*



*Neoscona sp. 2*



*Scytodes sp.*



*Thyene imperialis*



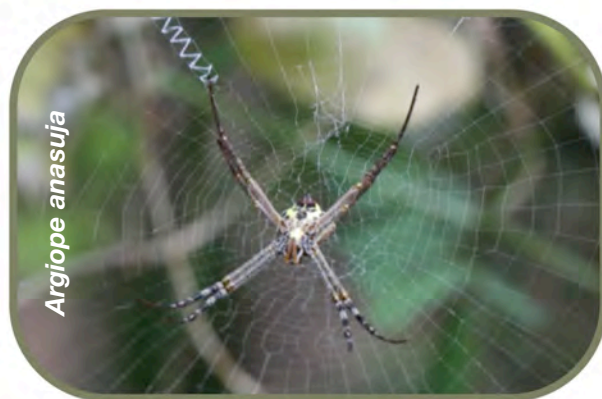
*Stenaelurillus sp.*



# Bugs R All

Invertebrate Conservation & Information Network of South Asia (ICINSA)

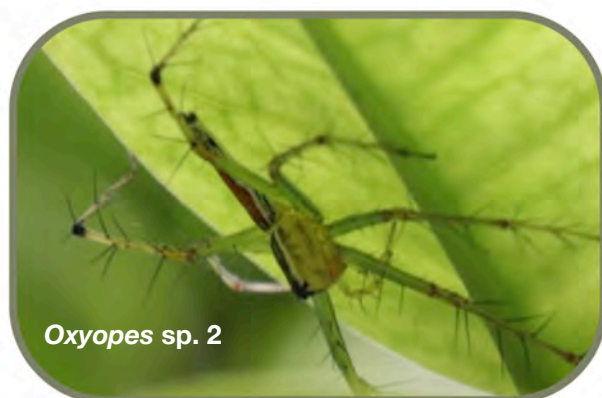
Newsletter of the



*Argiope anasuja*



*Heteropoda sp.*



*Oxyopes sp. 2*



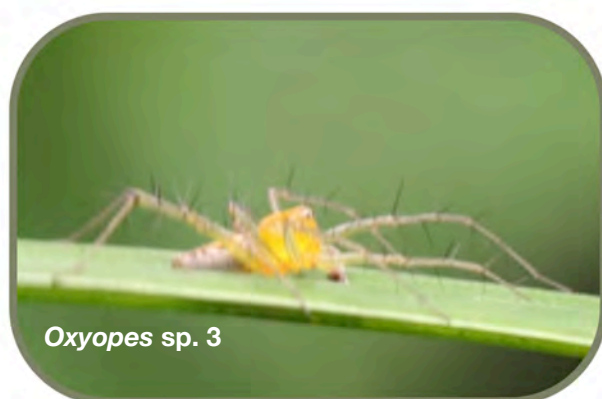
*Phintelloides sp.*



*Hersilia savignyi Lucas*



*Hyllus semicupreus*



*Oxyopes sp. 3*



*Neoscona crucifera*



# Bugs R All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)



*Guizygiella* sp.



*Oxytate* sp.



*Rudakius* sp.



*Gnaphosidae* sp.



*Neoscona* sp. 4



*Zosis* sp.



*Cyrtophora* sp3



*Phintella* sp.



# Bugs R All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)

*Eriovixia* sp. 1sp.



## References

**World Spider Catalog (2021).** World Spider Catalog. Version 22.5. Natural History Museum Bern. <http://wsc.nmbe.ch>. Accessed on 07.xii.2021.

**Sebastian, P.A. & K.V. Peter (2009).** *Spiders of India*. Universities Press (India) Private Limited, Hyderabad, India.

**Yadav, A., R. Solanki, M. Siliwal & D. Kumar (2017).** Spiders of Gujarat: a preliminary checklist. *Journal of Threatened Taxa* 9(9): 10697–10716.

**Acknowledgement:** We would like to express our sincere gratitude to Mr. S. Sivakumar for his invaluable guidance, suggestions and comments on the manuscript. We thank Dr. M.D. Momin for providing us the opportunity to carry out this work and for his guidance. We would also like to thank Mr. Dhruv Prajapati for identifying all the spider species listed in our study. We are grateful to Ms. Sweta and Mr. Sameer for helping us in GIS and map related work. We are thankful to the staff of Sundarvan for their cooperation and support throughout our field work.

**Paras Parikh<sup>1</sup>, Adit Nair<sup>2</sup>, Deep Shah<sup>3</sup>**

<sup>1-3</sup>Sundarvan - A Nature, Discovery Centre, Satellite Rd, Panchsheel Enclave, Jodhpur Tekra, Ahmedabad, Gujarat 380015

Email: <sup>1</sup>parikh.paras0405@gmail.com;

<sup>2</sup>adit32nair@gmail.com; <sup>3</sup>deep.shah@ceeindia.org

Citation: **Parikh, P, A. Nair, D. Shah (2022).**

Diversity of Spider fauna in Sundarvan, Ahmedabad, India. *Bugs R All* #234, In: *Zoo's Print* 37(3): 26–32.

Bugs R All is a newsletter of the Invertebrate Conservation and Information Network of South Asia (ICINSA) published with the financial support of Zoological Society of London. For communication, Email: [zp@zooreach.org](mailto:zp@zooreach.org)



# Bugs R All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)

## Black-spotted Pierrot, addition to the butterfly fauna of Chhattisgarh, India.



**Black-spotted Pierrot, upper-wing, 30 January 2020, Kurud. © Gulab Chand.**

Chhattisgarh is a centrally situated state in India and has a great biodiversity of butterflies studied and reported, with a total of 168 species (Chandra et al. 2007, 2014; Chandra & Sharma 2009; Dubey et al. 2015; Sisodia 2019; Tandan et al. 2020, 2021a,b; Nihalani 2021). A compiled checklist with 159 species of butterflies was published (Sisodia 2019) from 13 districts of Chhattisgarh out of 28 districts at that time, in which the Dhamtari district was not included in the study sites by earlier workers

on butterflies.

Dhamtari district was established on 6 July 1998 dividing the Raipur district of Chhattisgarh and situated between 20.71N & 81.55E at 457 m. Dhamtari, Kurud, Magarlod, and Nagri are revenue blocks of the Dhamtari district situated in the fertile plains of Chhattisgarh with a total area of about 4,084 sq.km. Geographically the Sihawa hill of the Satpura range is located to the east of the district. Mahanadi is the main river with tributaries being Sendur,



# Bugs & All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)



**Black-spotted Pierrot, upper-wing, 10 July 2020, Raipur.**  
© Gulab Chand.

Pairy, Sondur, Joank, Kharun, and Shivnath. The Ravishankar Sagar dam popularly known as Gangrel dam irrigates almost 57,000 ha of agricultural land. Due to its rich resources of water supply and natural habitat as well as man-made agro lands which serve food and shelter, the district has varied biodiversity. For the present study, we surveyed the various sites of all revenue blocks of Dhamtari as Bhatagaon

nursery, Kodebode village, Atang village, Govt. P.G. College Campus in Kurud block, Megha in Magarload, Gangrel and P.G. College Campus in Dhamtari block, Gadhdongari village, and Sihawa in Nagari block. Field visits and surveys were done in the morning hours, digital specimens were photographed by DSLR Camera Canon 1300D, and mobile phones - iPhone 5S. As a result, we found, one species *Tarucus balkanicus*

*nigra* was previously unreported from Chhattisgarh. The identification was made by field characters using BNHS field guide (Kehimkar 2016) but species was confirmed with online help by Krushnamegh Kunte.

## **Black-spotted Pierrot**

*Tarucus balkanicus nigra*

**Bethune-Baker, [1918]**

## **Specimen Recorded:**

30.i.2020, Kodebod village of Kurud Block, Dhamtari District, & 10.vii.2020, Science college campus Raipur, Chhattisgarh, by Gulab Chand.

**Known distribution:** The species is widely distributed, ranging through Africa, southeastern Europe, western Asia, and southern Asia - the Indian subcontinent (Evans 1955). In India it is distributed in north of Maharashtra to West Bengal (Varshney & Smetacek 2015). Basu *et al.* (2019) based on close inspection of phenotypes of the specimens and dissection of the male genitalia

# Bugs R All

Newsletter of the Invertebrate Conservation & Information Network of South Asia (ICINSA)

described the distribution of *T. balkanicus nigra* in the Indian subcontinent including peninsular and central India (Madhya Pradesh, Odisha, Telangana, and Tamil Nadu).

**The species photographed shows three black spots in dull dark blue background at center of upper forewing, narrow black border at cell end in upper forewing and tailed hind wing.** The species is multivoltine, found in scrub forests, common in open and dry habitats, widely distributed from coastal plains to ca. 2,300 m in the Himalaya, flying throughout the year (Kunte 2017). Present observation was made and photographed during a field visit at Kodebod village in a small grassland area near national highway 30, Raipur to Jagdalpur road. The soil type is laterite and locally known as Murum, based on which the village area is known as Bhatapara. Laterite is a soil type having rich iron and aluminum in hot and wet tropical areas.

Basu *et al.* (2019) provided a taxonomic and nomenclatural review of eight species of the group of Afro-Oriental butterflies *Tarucus* (Lepidoptera: Lycaenidae) in the Indian Subcontinent as *T. balkanica nigra* Bethune Baker, [1918] — Black-spotted Pierrot, *T. callinara* Butler, 1886 — Spotted Pierrot, *T. hazara* Evans, 1932 — Dark Violet Pierrot, *T. venosus* Moore, 1882 — Veined

Pierrot, *T. nara* (Kollar, 1848) — Striped Pierrot, *T. indica* Evans, 1932 — Transparent Pierrot, *T. ananda* (de Nicéville, [1884]) — Dark Pierrot and *T. waterstradti* Druce, 1895 — Separate Pierrot. Chandra *et al.* (2007) reported three species of *Tarucus* as *T. nara*, *T. indica*, and *T. callinara* from Bastar, Dantewada & Kanker, and one species *T. balkanica* from Madhya Pradesh. Further, Chandra *et al.* (2014) reported four species of *Tarucus* as *T. plinius*, *T. callinara*, *T. nara* and *T. theophrastus* from Chhattisgarh. Sisodia (2019) in his compiled checklist of 159 species included two species of *Tarucus* as *T. callinara* and *T. nara* but he put these two species on the tentative list because there have been no further records for confirmation of the presence of these species in Chhattisgarh. In the present study, we have recorded *T. balkanicus nigra* adding as a new record for the state Chhattisgarh from Kodebod village of Kurud block, District Dhamtari, Chhattisgarh.

The observations of *T. balkanicus nigra* were also made from Chhattisgarh and uploaded on Butterflies of India website [www.ifoundbutterflies.org](http://www.ifoundbutterflies.org), observed by Kavita R Das, on 02 June 2020 & 10 July 2020 at Chhattisgarh Takniki Vidhyapith Amanaka, District Raipur, and Kamal Kishore Jangde on 28 August 2020 at Malkharoda, Janjgir-Champa district of Chhattisgarh state (Churi *et al.* 2020).



# Bugs R All

Newsletter of the Invertebrate Conservation & Information Network of South Asia (ICINSA)

## References

**Basu, D. N., P. Churi, A. Soman, A. Sengupta, M. Bhakare, S. Lokhande, S. Bhoite, B. Huertas & K. Kunte (2019).** The genus *Tarucus* Moore, [1881] (Lepidoptera: Lycaenidae) in the Indian Subcontinent. *Tropical Lepidoptera Research* 29(2): 87–110.

**Chandra, K. (2006).** The butterflies (Lepidoptera: Rhopalocera) of Kangerghati National Park (Chhattisgarh), pp. 83–88. In: Goel, S.C. (eds.). *Advancement in Indian Entomology: Productivity and Health*. Uttar Pradesh Zoological Society, Muzaffarnagar, India.

**Chandra, K., A. Raha, A. Majumder & R. Gupta (2014).** New records and updated list of butterflies (Lepidoptera: Rhopalocera) from Chhattisgarh, Central India. *Records of Zoological Survey of India* 114: 233–250.

**Chandra, K., R.M. Sharma, A. Singh & R.K. Singh (2007).** A checklist of butterflies of Madhya Pradesh and Chhattisgarh states, India. *Zoos' Print Journal* 22(8): 2790–2798.

**Churi, P., A. Soman & A. Sengupta (2020).** *Tarucus balkanica* (Freyer, 1844) – Little Tiger Pierrot. Kunte, K., S. Sondhi & P. Roy (Chief Editors). *Butterflies of India*, v. 2.88. Indian Foundation for Butterflies. <http://www.ifoundbutterflies.org/sp/1127/Tarucus-balkanica>.

**Dubey, S., R. K. Agarwal & S. Mondal (2015).** New Records of butterflies (Lepidoptera: Hesperidae) in Bastar District (C.G), India. *Bioline* 3(2): 528–532.

**Evans, W. H. (1955).** A revision of the genus *Tarucus* (Lepidoptera: Lycaenidae) of Europe, North Africa and Asia. *The Entomologist* 88: 179–187.

**Kehimkar, I. (2016).** Butterflies of India, *Bombay Natural History Society*, Mumbai, xii+528 pp.

**Kunte, K. (1997).** Seasonal patterns in butterfly abundance and species diversity in four tropical habitats in northern Western Ghats. *Journal of Biosciences* 22: 593–603.

**Nihlani G., F. Bux & A.M.K. Bharos (2021).** First record of Spotted Angle butterfly *Caprona agama agama* (Moore, 1858) (Lepidoptera: Papilionoidea: Hesperidae) from Bhoramdev Wildlife Sanctuary, Chhattisgarh, India. *Revista Chilena de Entomología* 47(2): 259–264.

**Sisodia, A. (2019).** Butterflies (Lepidoptera: Papilionoidea) of Chhattisgarh, India. *Bionotes* 21(4): 116–141.

**Tandan, H.N., G. Chand, R. Naidu & S. Tandan (2020).** Butterflies of Government Nursery, Bhatagaon,

Chhattisgarh with two additions to the state fauna. *Bionotes* 22(3): 195–201.

**Tandan, H.N., R. Naidu, G. Chand & G.D. Sampat (2021a).** Butterflies of Tatamari Eco Centre, Chhattisgarh, India. *Bugs R All* #204, In: *Zoo's Print* 36(9): 1–6.

**Tandan, H.N., G. Chand, R. Naidu, S. Tandan, G. K. Sahu, R. Agrawal & Tanuja (2021b).** Checklist of Butterflies (Insecta: Lepidoptera) from four district of Chhattisgarh, India with three addition to the state fauna of butterflies of Chhattisgarh. *Bionotes* 23 (2&3): 96–106.

**Varshney, R.K. & P. Smetacek (2015).** A synoptic Catalogue of the Butterflies of India. Butterfly Research Centre, Bhimtal and Indinov Publishing, New Delhi, ii+261 pp., 8 pl.

**Acknowledgment:** The Authors are thankful to Renu Maheshwari, Professor, Govt. N.P.G. College of Science, Raipur, Chhattisgarh, for encouragement to work on the biodiversity of Chhattisgarh. We are also thankful to Dr. Kavita R Das, Assistant Professor, Govt. N.P.G. College of Science, Raipur, and Shri Kamal Kishore Jangde, Janjgir-Champa, for their contribution to the butterfly fauna of the Chhattisgarh State

## Gulab Chand<sup>1</sup>, H.N. Tandan<sup>2</sup> & Ravi Naidu<sup>3</sup>

<sup>1</sup>Department of Botany, Govt. N. P. G. College of Science, Raipur, Chhattisgarh 492001, India. Email: [gulab.s.sahu@gmail.com](mailto:gulab.s.sahu@gmail.com).

<sup>2</sup>Department of Zoology, S.G. G.P. G. College Kurud, Chhattisgarh 493663, India. Email: [tandanhn79o@gmail.com](mailto:tandanhn79o@gmail.com)

<sup>3</sup>C.R.O.W. Foundation, Jagdalpur, Chhattisgarh 494001, India. Email: [ravinaidu0001@gmail.com](mailto:ravinaidu0001@gmail.com).

**Citation: Chandi, G., H.N. Tandan, R. Naidu (2022).** Black-spotted Pierrot, addition to the butterfly fauna of Chhattisgarh, India. *Bugs R All* #235, In: *Zoo's Print* 37(3): 33–36.

Bugs R All is a newsletter of the Invertebrate Conservation and Information Network of South Asia (ICINSA) published with the financial support of Zoological Society of London. For communication, Email: [zp@zooreach.org](mailto:zp@zooreach.org)



# On a collection of Orthoptera from Prayagraj District, Uttar Pradesh, India

Orthoptera is a group of economically important insects including locusts, grasshoppers, katydids, and crickets. Prayagraj is a district of Uttar Pradesh which is situated in the northern region of India. Most of the population in the state is engaged in agriculture. Being a pest of agricultural crops, studies on taxonomy, distribution, and diversity of Orthoptera in this region were carried out by different workers. Shishodia et al. (2010) reported 100 species belonging to 67 genera under nine families from Uttar Pradesh. Usmani et al. (2010), Sharma (2011), and Rafi & Usmani (2013) studied acridid fauna in different regions of Uttar Pradesh. Four species of Orthoptera were reported as endemic to Uttar Pradesh (Chandra & Gupta 2013). Farooqi & Usmani (2016) prepared a checklist of Tettigoniidae of Uttar Pradesh. Recently, Mobin et al. (2017) compiled a checklist of acridids from Uttar Pradesh. In the present document, identification of orthopteran species found in Sam Higginbottom Institute of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh is provided with a key to species and photographs. The specimens of Orthoptera were collected from Sam Higginbottom Institute of Agriculture, Technology and Sciences, Prayagraj, Uttar

Pradesh (25.41351N 81.84686E, 96 m) during a survey conducted in connection with the green skill development programme on 25 August 2017. The collection was made with the help of sweeping net and by direct hand picking. For the morphological studies, specimens were relaxed, stretched, pinned, and labeled. Identification was done with the help of literature. Photographs were taken by a Nikon digital camera (D-7000). All the specimens were collected by H. Kumar and party and deposited in the National Zoological Collection of Zoological Survey of India, Kolkata, India (NZSI).

Altogether, 34 specimens were collected, which revealed the identification of 20 species belonging to 17 genera and 12 subfamilies under four families of Orthoptera. The maximum numbers of specimens belong to family Acrididae. In terms of species richness, subfamily Oedipodinae was the maximum (25%) followed by Acridinae, Hemiacridinae, Oxyinae and Pyrgomorphinae, all of them are represented by 10%. If numbers of specimens are considered, *Spathosternum prasiniferum prasiniferum* (Walker, 1871) was found to be maximum.



# BugsRAll

Newsletter of the Invertebrate Conservation & Information Network of South Asia (ICINSA)

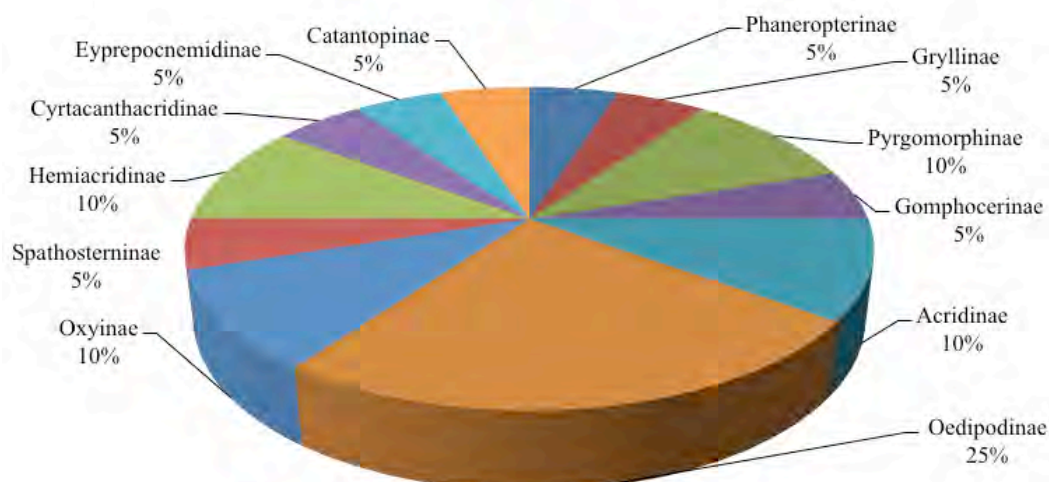
## Taxonomic account

	Species	No. of males	No. of females
<b>Order Orthoptera Olivier 1789</b> <b>A. Suborder Ensifera Ander 1939</b> <b>a. Superfamily Tettigonioidea Krauss 1902</b> <b>I. Family Tettigoniidae Krauss 1902</b> <b>i. Subfamily Phaneropterinae Burmeister 1838</b>			
1.	<i>Himertula kinneari</i> (Uvarov 1923) (Image 1)	1	-
<b>b. Superfamily Grylloidea Laicharting 1781</b> <b>I. Family Gryllidae Laicharting 1781</b> <b>i. Subfamily Gryllinae Laicharting 1781</b>			
2.	<i>Velarifictorus (Velarifictorus) aspersus</i> (Walker 1869) (Image 2)	1	1
<b>B. Suborder Caelifera Ander 1939</b> <b>a. Superfamily Pyrgomorphoidea Brunner von Wattenwyl 1874</b> <b>I. Family Pyrgomorphidae Brunner von Wattenwyl 1874</b> <b>i. Subfamily Pyrgomorphinae Brunner von Wattenwyl 1874</b>			
3.	<i>Chrotogonus (Chrotogonus) trachypterus trachypterus</i> (Blanchard 1836) (Image 3)	-	1
4.	<i>Atractomorpha crenulata crenulata</i> (Fabricius 1793) (Image 4)	1	-
<b>b. Superfamily Acridoidea MacLeay 1821</b> <b>I. Family Acrididae MacLeay 1821</b> <b>i. Subfamily Gomphocerinae Fieber 1853</b>			
5.	<i>Aulacobothrus sinensis</i> (Uvarov 1925) (Image 5)	-	1
<b>ii. Subfamily Acridinae MacLeay 1821</b>			
6.	<i>Acrida exaltata</i> (Walker 1859) (Image 6)	2	-
7.	<i>Phlaeoba infumata</i> Brunner von Wattenwyl 1893 (Image 7)	1	-
<b>iii. Subfamily Oedipodinae Walker 1871</b>			
8.	<i>Trilophidia annulata</i> (Thunberg 1815) (Image 8)	1	
9.	<i>Aiolopus simulatrix simulatrix</i> (Walker 1870) (Image 9)	1	1
10.	<i>Aiolopus thalassinus tamulus</i> (Fabricius 1798) (Image 10)	-	1
11.	<i>Gastrimargus africanus africanus</i> (Saussure 1888) (Image 11)	-	1
12.	<i>Ceracris nigricornis nigricornis</i> Walker 1870 (Image 12)	1	1

# BugsR All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)

	Species	No. of males	No. of females
<b>iv. Subfamily Oxyinae Brunner von Wattenwyl 1893</b>			
13.	<i>Oxya velox</i> (Fabricius 1787) (Image 13)	1	1
14.	<i>Oxya japonica japonica</i> (Thunberg 1815) (Image 14)	-	1
<b>v. Subfamily Spathosterninae Rehn, 1957</b>			
15.	<i>Spathosternum prasiniferum prasiniferum</i> (Walker 1871) (Image 15)	5	2
<b>vi. Subfamily Hemiaceridinae Dirsh 1956</b>			
16.	<i>Hieroglyphus banian</i> (Fabricius 1798) (Image 16)	2	
17.	<i>Hieroglyphus nigrorepletus</i> Bolívar 1912 (Image 17)	-	2
<b>vii. Subfamily Cyrtacanthacridinae Kirby 1910</b>			
18.	<i>Cyrtacanthacris tatarica tatarica</i> (Linnaeus 1758) (Image 18)	2	-
<b>viii. Subfamily Eyprepocnemidinae Brunner von Wattenwyl 1893</b>			
19.	<i>Eyprepocnemis alacris alacris</i> (Serville 1838) (Image 19)	1	-
<b>ix. Subfamily Catantopinae Brunner von Wattenwyl 1893</b>			
20.	<i>Choroedocus illustris</i> (Walker 1870) (Image 20)	-	1



**Percentage occurrence of different subfamilies of Orthoptera.**



# Bugs R All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)

## Key to species

1. Antennae shorter than body with fewer than 30 segments; tympanal organ if present at the base of abdomen; stridulatory apparatus varied or absent but typically femoro-allary; ovipositor when present short and robust, with inner valves reduced ..... **3**
  - Antennae about as long as body with many segments; tympanal organ if present on the fore tibia; stridulatory apparatus when present usually tegminal; ovipositor when present usually more or less elongate ..... **2**
2. Tarsi 4-segmented ..... **Himertula kinneari** (Uvarov 1923)
  - Tarsi 3-segmented ..... **Velarifictorus (Velarifictorus) aspersus** (Walker 1869)
3. Head of variable shape, but not acutely conical; fastigial furrow absent ..... **5**
  - Head acutely conical, with regularly incurved frons; fastigial furrow present ..... **4**
4. Body depressed and usually rather strongly rugose; tegmina with small nodules on main veins; prosternum with reflexed, collar-like anterior margin ..... **Chrotogonus (Chrotogonus) trachypterus trachypterus** (Blanchard 1836)
  - Bodyless robust, not depressed, or, if slightly so (some females); tegmina without nodules on main veins; prosternum without reflexed, collar-like anterior margin ..... **Atractomorpha crenulata crenulata** (Fabricius 1793)
5. Prosternal process present; hind tibia with or without external apical spine ..... **13**
  - Prosternal process usually absent, if present, body strongly elongate and antennae ensiform; hind tibia without external apical spine ..... **6**
6. Stridulatory serration on inner side of hind femur absent ..... **7**
  - Stridulatory serration on the inner side of hind femur present ..... **Aulacobothrus sinensis** (Uvarov 1925)
7. Body rather sturdy; frons usually vertical; medial area of tegmen with intercalary vein usually serrated ..... **9**
  - Body usually slender; frons oblique; medial area of tegmen usually without intercalary vein, if present, never serrated in both sexes ..... **8**
8. Head elongate; hind femur very long and slender ..... **Acrida exaltata** (Walker 1859)
  - Head never elongate; Hind femur never very long and slender ..... **Phlaeoba infumata** Brunner von Wattenwyl 1893
9. Pronotum with median carina crossed by one transverse sulcus or not crossed at all ..... **10**
  - Pronotum with median carina crossed by two transverse sulci ..... **Trilophidia annulata** (Thunberg 1815)
10. Pronotum with median carina well developed ..... **12**
  - Pronotum with median carina weak ..... **11**
11. Hind femora short and stout, as wide as width of tegmina; pronotum weakly narrowed and moderately constricted in prozona ..... **Aiolopus simulatrix simulatrix** (Walker 1870)
  - Hind femora long and slender, narrower than width of tegmina; pronotum saddle-shaped, distinctly narrowed and constricted in prozona ..... **Aiolopus thalassinus tamulus** (Fabricius 1798)
12. Pronotum with lateral carina weak or absent ..... **Gastrimargus africanus africanus** (Saussure 1888)
  - Pronotum with lateral carina well developed ..... **Ceracris nigricornis nigricornis** Walker 1870
13. Lower knee lobe of hind femur never spined; valves of ovipositor never serrate or spined; hind tibia never flattened ..... **15**
  - Lower knee lobe of hind femur spined; valves of ovipositor serrate or spined; hind tibia flattened .. **14**
14. Posterior ventral basivalvular sclerites of ovipositor without any well-defined spines on its lower inner margin .....

# Bugs R All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)



Image 1. *Himertula kinneari* (Uvarov 1923)



Image 2. *Velarifictorus (Velarifictorus) aspersus* (Walker 1869)



Image 5. *Aulacobothrus sinensis* (Uvarov 1921)



Image 6. *Acrida exaltata* (Walker 1859)



Image 3. *Chrotogonus (Chrotogonus) trachypterus trachypterus* (Blanchard 1836)



Image 4. *Atractomorpha crenulata crenulata* (Fabricius 1793)



Image 7. *Phlaeoba infumata*  
Brunner von Wattenwyl 1893



Image 8. *Triophidia annulata*  
(Thunberg 1815)



Image 9. *Aioliopus simulatrix simulatrix* (Walker 1870)



Image 10. *Aioliopus thalassinus tamulus*  
(Fabricius 1798)



Image 13. *Oxya velox* (Fabricius 1787)



Image 14. *Oxya japonica japonica*  
(Thunberg 1815)



Image 11. *Gastrimargus africanus africanus* (Saussure, 1888)



Image 12. *Ceracris nigricornis nigricornis*  
(Walker 1870)



Image 15. *Spathosternum prasiniferum prasiniferum*  
(Walker 1871)



Image 16. *Hieroglyphus banian*  
(Fabricius 1798)



# Bugs R All

Newsletter of the Invertebrate Conservation & Information Network of South Asia (ICINSA)



Image 17. *Hieroglyphus nigrorepletus* (Bolivar 1912)



Image 18. *Cyrtacanthacris tatarica tatarica* (Linnaeus 1758)



Image 19. *Eyprepocnemis alacris alacris* (Serville 1838)



Image 20. *Choroedocus illustris* (Walker 1870)

..... ***Oxya velox*** (Fabricius 1787)

- Posterior ventral basivalvular sclerites of ovipositor with one or two tooth-like spines on its inner ventral margin .... ***Oxya japonica japonica*** (Thunberg 1815)

15. Radial area of tegmen without transverse stridulatory veinlets; valves of aedeagus flexure; arolium of variable size ..... **18**

- Radial area of tegmen with a series of regular, parallel, thickened, transverse stridulatory veinlets; valves of aedeagus divided or connected by small or indistinct flexure; arolium large ..... **16**

16. Prosternal process transverse, lamellate, subquadrate or approximately so in outline; apical abdominal tergite with well indicate or subobsolete furcular lobes .....

..... ***Spathosternum prasiniferum prasiniferum*** (Walker 1871)

- Prosternal process usually conical; apical abdominal tergite without furcular lobes ..... **17**

17. Dorsum of pronotum without bands connecting all sulci; male cercus more or less bilobate or bifurcated ... ***Hieroglyphus banian*** (Fabricius 1798)

- Dorsum of pronotum with two broad black parallel bands connecting all sulci; male cercus truncated and pointed .....

..... ***Hieroglyphus nigrorepletus*** Bolívar 1912

18. Mesosternal lobes rounded; ancorae well developed and curved; pronotum with median carina never raised; spermatheca with apical diverticulum moderately long ..... **19**

- Mesosternal lobes rectangular; ancorae small or indistinct; pronotum with median carina slightly raised; spermatheca with apical diverticulum very long and slender .....

. ***Cyrtacanthacris tatarica tatarica*** (Linnaeus 1758)

19. Pronotum with lateral carinae linear; apex of male abdomen normal .....

..... ***Eyprepocnemis alacris alacris*** (Serville 1838)

- Pronotum without lateral carinae, if present, never linear; apex of male abdomen inflated .....

..... ***Choroedocus illustris*** (Walker 1870)

Although 100 species of Orthoptera were reported by Shishodia et al. (2010) from Uttar Pradesh, 15 species belonging to 12 genera in five subfamilies of Tettigoniidae were recorded by Farooqi & Usmani (2016) and 78 species/subspecies belonging to 49 genera in 12 subfamilies of Acrididae were recorded by Mobin et al. (2017). These recent publications showed that in Uttar Pradesh Acrididae is the most dominant family of Orthoptera. Presence of 16 species of Acrididae out of total 20 species of Orthoptera in the collection again shows the dominance of Acrididae in Uttar Pradesh.

# Bugs R All

Newsletter of the  
Invertebrate Conservation & Information Network of South Asia (ICINSA)

## References

**Chandra, K. & S.K. Gupta (2013).** Endemic Orthoptera (Insecta) of India. *Prommalia* 1: 17–44.

**Farooqi, M.K. & M.K. Usmani (2016).** A checklist of Tettigoniidae (Orthoptera: Tettigonoidea) from Uttar Pradesh state, India. *Uttar Pradesh Journal of Zoology* 36(2): 149–154.

**Mobin, S., H. Kumar & M.K. Usmani (2017).** A Checklist of Acrididae (Orthoptera: Acridoidea) of Uttar Pradesh, India. *Trends in Biosciences* 10(43): 8907–8912.

**Rafi, U. & M.K. Usmani (2013).** Diversity and Distribution of Acridid Pests (Orthoptera: Acrididae) of Purvanchal region, Uttar Pradesh, India. *Journal of the Bombay Natural History Society* 110(1): 50–56.

**Sharma, N. (2011).** Acridoidea (Orthoptera: Insecta) Diversity of Sur Sarovar Bird Sanctuary, Keetham, Agra (Uttar Pradesh, India). *Records of Zoological Survey of India* 111(2): 23–28.

**Shishodia, M.S., K. Chandra & S.K. Gupta (2010).** An Annotated Checklist of Orthoptera (Insecta) from India. *Records of Zoological Survey of India, Occasional Paper* No. 314: 1–366. Zoological Survey of India, Kolkata.

**Usmani, M.K., M.I. Khan & H. Kumar (2010).** Studies on Acridoidea (Orthoptera) of western Uttar Pradesh. *Biosystematica* 4(1): 39–58.

**Hirdesh Kumar<sup>1</sup>, Kailash Chandra<sup>2</sup>, Jagdish Saini<sup>3</sup> & Sandeep Kushwaha<sup>4</sup>**

<sup>1–4</sup> Zoological Survey of India, Prani Vigyan Bhawan, Block M, New Alipore, Kolkata, West Bengal 700053, India  
Email: entomologist1985@gmail.com<sup>1</sup> (corresponding author); kailash.chandra61@gov.in<sup>2</sup>; jsaini44@yahoo.in<sup>3</sup>; sandeepkushwaha\_17@yahoo.com<sup>4</sup>

**Citation:** Kumar, H., K. Chandra, J. Saini & S. Kushwaha (2022). On a collection of Orthoptera from Prayagraj District, Uttar Pradesh, India. *Bugs R All* #236, In: *Zoo's Print* 37(3): 37–43.

**Acknowledgements:** The authors are highly thankful to the director, Zoological Survey of India, Kolkata for providing necessary facilities and encouragements. We wish to extend our gratitude to the Ministry of Environment Forest and Climate Change, New Delhi for providing financial assistance for a large grant research project (Ref. No. NMHS/LG-2016/0011) entitled “Biodiversity Assessment through long-term monitoring plots in Indian Himalayan Landscape”. Thanks is also given to all the staff members of Zoological Survey of India, Kolkata.

Bugs R All is a newsletter of the Invertebrate Conservation and Information Network of South Asia (ICINSA) published with the financial support of Zoological Society of London.  
For communication, Email: zp@zooreach.org

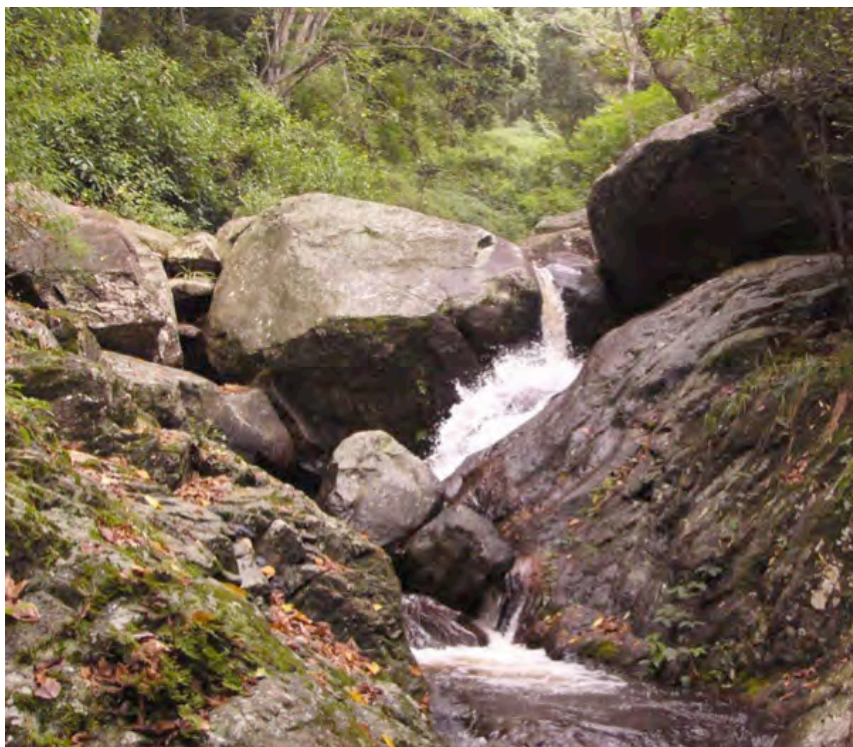




# New distribution record of Bhupathi's Purple Frog from Agamalai Hills, Western Ghats, India

The genus *Nasikabatrachus* Biju & Bossuyt, 2003 comprise two species, *Nasikabatrachus sahyadrensis* known from the western slopes of the Western Ghats, India (Zachariah et al. 2012) and *N. bhupathi* (Janani et al. 2017) known only from the eastern slopes of Watrap Range, Sriviliputhur Grizzled Giant Squirrel Wildlife Sanctuary, Tamil Nadu. In this note, I report *Nasikabatrachus* cf. *bhupathi* tadpoles from a previously unknown location in the Western Ghats of India.

During the bird watching trip on 7 October 2012, I sighted six tadpoles of *Nasikabatrachus* cf. *bhupathi* attached to rocks of fast flowing stream in the Kannakkarai Falls (10.131254N, 77.437499E, 550 m), Agamalai Hills, Theni, Tamil Nadu, India. The surrounding habitat is riparian forest with private estates. The currently reported location is in the eastern



View of Kannakkarai Falls, Agamalai, Theni.



Tadpoles of *Nasikabatrachus* cf. *bhupathi* in Kannakkarai Falls, Agamalai, Theni.



**Distribution map of *Nasikabatrachus cf. bhupathi*.**

slopes of the Western Ghats, approximately 50 km aerial distance from the type locality of *Nasikabatrachus bhupathi*.

The currently reported location is one of the famous weekend celebration sites in this region that faces serious threats and the stream is also used for washing clothes. Detailed study is warranted to understand the distribution and threats of *Nasikabatrachus cf. bhupathi* in the eastern slopes of the Western Ghats.

#### References

**Biju, S.D. & F. Bossuyt (2003).** New frog family from India reveals an ancient biogeographical link with the Seychelles. *Nature* 425: 711–714.

**Janani, S.J., K. Vasudevan, E. Prendini, S.K. Dutta & R. Aggarwal (2017).** A new species of the Genus *Nasikabatrachus* (Anura, Nasikabatrachidae) from the eastern slopes of the Western Ghats, India. *Alytes* 34(1–4): 1–19.

**Zachariah, A., R.K. Abraham, S. Das, K.C. Jayan & R. Altig (2012).** A detailed account of the reproductive strategy and developmental stages of *Nasikabatrachus sahyadrensis* (Anura: Nasikabatrachidae), the only extant member of an archaic frog lineage. *Zootaxa* 3510: 53–64.

**Acknowledgements:** I thank Arun Kanagavel and Karthik (Palni Hills Conservation Council) for their support during the trip.

#### A. Kalaimani

Care Earth Trust, No.4, 20th Street, Thillaiganga Nagar, Nanganallur, Chennai, Tamil Nadu 600061, India.  
Email: manikalai16@yahoo.com

**Citation:** Kalaimani, A. (2022). New distribution record of Bhupathi's Purple Frog from Agamalai Hills, Western Ghats, India. *frog leg* #142. In: *Zoo's Print* 37(3): 44–45.



## Sighting of the Critically Endangered Christmas Island Frigatebird off Chombala Coast, Kerala



Christmas Island Frigate Bird ©Abdulla Paleri.

Christmas Island Frigatebird *Fregata andrewsi* in the nonbreeding season is found in many parts of Indonesia, Malaysia, Thailand, and occurs as a vagrant in Andaman & Nicobar Island, & southern India. Some rare sightings from Australia and another from Kenya (Orta 1992; Wells 1999; BirdLife International 2001) have been recorded.

This is a Critically Endangered (BirdLife International 2013) sea bird and an endemic breeder in Christmas Island (10°25S, 105°40E), in the eastern Indian Ocean, about 360 km south of Java, Indonesia (Francisca & Janos 2015). The population census shows that there are 2,400–4,800 adult individuals

(Stokes 1988; James 2003). There are about 600 pairs of breeding birds and the population has declined severely by 66% over three generations (BirdLife International 2014). The possible threats being faced by the bird away from its breeding site were studied and the main threats recorded were entanglement in fishing gear, capture and attachment of string to the leg, poisoning/ sedating, and shooting (Francisca & Janos 2015). The status and threats the bird faces show that the sighting and observation of the bird anywhere has great significance to chalk out new plans and to revise the existing plans for the effective management and protection of this critically endangered species.

### Sight records in India

The sight record of this bird from India had not been confirmed for long. Ali & Ripley (1983) emphasized that there was no authentic sight record of this bird from India. A specimen from Kollam, Kerala (Prater 1929) and another one from Sri Lanka were identified as this species but later they were confirmed as Lesser Frigatebird *Fregata minor* (Abdulali 1961; Philips 1953).

A juvenile bird was reported to have been sighted from Andamans (Saxena 1994) but remained unconfirmed. Other reports from Kerala (Prater 1929; Pillai 1964; Kumar & Kumar 1997) are not substantiated. Santharam (1982) from Tamil Nadu and Dwarakanath (1981) from Karnataka are misreported. But a specimen recovered (2006) from Parganas District of West Bengal and now kept in ZSI Kolkata was identified as *F. andrewsi* (Sen 2011). Ankola, Karnataka (eBird 2014), Lakkavalli, Karnataka (eBird 2018) are the other sighting records. There is only one confirmed record from Alapuzha, Kerala (eBird 2014).

The present observation has been made from the Arabian Sea off Chombala coast (11.6684 °N, 75.5588 °E) in the Kozhikode District, Kerala. On 29 June 2019, at 0700 h, a few local fishermen who returned from the Arabian Sea after fishing brought an immature frigatebird to the shore of Chombala fishing harbour. The bird was found bleeding from a wound in the chest. According to the fishermen, the bird flew into their boat and was unable to fly away

due to the injury it sustained. According to the fisherfolk, the boat was approximately 1 km away from the shore and the nature and cause of the injury of the bird were unknown. The bird was taken to the nearby veterinary hospital for treatment. After the bleeding was arrested by the veterinary treatment, the bird was brought to the Regional Forest Office for further care. The bird was kept in the cage was seen flapping its wings but unable to open the wings fully enough to fly.

The bird was given small marine fish and water for drinking but it did neither eat nor drink. A few hours later on the same day the bird was taken to the Kerala Veterinary and Animal Sciences University, Pookodu, Wayanad District, 70km away from the forest office where the bird was initially kept. The bird did not respond to the medicines and care given at the Animal Sciences Center and died on 5 July 2019. Postmortem report showed that the bird died of a deep wound in the chest that led to the fracture of the sternum and a few rib bones.

At the first look itself, it was identified as an immature Frigatebird, *Fregata* sp. To confirm the identification up to species level, the photographs of the bird were uploaded in the various bird identification groups. Three expert birders (Sean Minns of Britain, Andrew Paul Bailey of Bulgaria, and Klaus Malling Olsen of Denmark) commented that most probably the bird was an immature Christmas Island Frigatebird, *Fregata andrewsi*. To further confirm the identification up to species level, the images



of the bird were sent to the leading Christmas Island Frigatebird expert David James of Australia. He confirmed the bird was a first cycle Christmas Island Frigate bird, *Frigata andrewsi*. He made the following comments on the images of the bird:

- “The bird is in first cycle plumage. The rufous feathers on the chest are formative plumage acquired in the partial pre-formative (post-juvenile) moult, which begins around the time of fledging.
- The pre-formative moult distorts the shape of the breast band making it harder to use the belly shape for identification, as the moult progresses. The shape of the belly patch is difficult to determine in all the photos.
- There is a slight nuchal crest. Great and Lesser Frigatebirds never have a nuchal crest. It is a prominent feature of adult Christmas and is present in its first stage of the bird, although less developed. This is probably diagnostic.
- There are small pure white patches on the scapulars. I have never seen these on any frigatebird except adult Christmas. They are rare in adults. It seems they must also occur on first cycle birds (and probably all other ages) as a rare feature. However, it might be an effect of feather displacement due to handling.
- The white belly patch extends well behind the base of the legs, which is typical of Christmas in the first cycle.
- The fringes of the alar bar are not especially prominent and there is no scaling on the mantle (correlated features). Some Christmas (probably females) show extremely pale alar bars and extensive pale fringes on the mantle but others do not (probably males). This feature does not eliminate Christmas.
- Axillary spurs occur in all three Asian species and can be diagnostic. They are variable, however. The axillary spur seems to be confined to the body; they certainly do not extend far into the underwing coverts. Short spurs can mean either Great or Christmas. Ragged spurs usually mean Christmas. However, the photos do not show this feature clearly, and it is difficult to know how much the feathers are disturbed and out of position.
- The bill appears to be very long. However, judging such things by the eye is ill-advised.
- In summary, the most important feature appears to be the crest feathers. Without these, I think the identification would be very uncertain.”

Finally, examining the video and the images later, he sent the conclusion as follows:

“I have looked at the white patches on the scapulars. Therefore, there are two features that are diagnostic of Christmas Frigatebird. Slightly elongated nape feathers form a messy nuchal crest and an irregular white patch on the upper scapulars on each side. Thus, it is a Christmas Frigatebird. Great and Lesser frigatebirds are safely ruled out”.

There are five species of Frigatebirds out of which three species *Fregata minor*, *F. ariel*, and *F. andrewsi* have been reported from the Indian subcontinent (Ramussen & Anderton 2012; Grimm et al. 2016). *F. minor* and *F. ariel* reported from Kerala are accidental straggler or storm-driven in the monsoon season (Ali 1969). Similarly, the *F. andrewsi* reported from Kerala including the present one might be storm blown during the monsoon season. The exact cause of the incident that wounded the bird is unknown but most probably it could be due to the flight hit against a ship or boat in the sea. The bird in the first-cycle plumage would not be so strong as to fly avoiding the obstacles on its way. Besides, the wind would be very strong forcing the bird to deviate from its flight direction and consequent flight control.

## References

- Orta, J. (1992).** Family Fregatidae. In: del Hoya, J., A. Elliot & J. Sargtal (eds.). *Handbook of the Birds of The World, Vol. 1*. Lynx Edicions, Barcelona, Spain.
- Wells, D.R. (1999).** *The Birds of the Thai-Malay Peninsula, non-passerines, Vol. 1*. Academic Press, London, 648 pp.
- BirdLife International (2001).** Threatened Birds of Asia: the Birdlife International Red Data Book. BirdLife International, Cambridge, U.K.
- BirdLife International (2013).** *Fregata andrewsi* IUCN Red List of Threatened Species.
- Francisca, N. & C.H. Janos (2015).** Threats to the critically Endangered Christmas Island Frigatebird *Fregata andrewsi* in Jakarta Bay, Indonesia, and implications for reconsidering conservation priorities. *Marine Ornithology* 43: 137–140
- James, D.J. (2003).** A survey of Christmas Island Frigatebird nests in 2003. Christmas Island, Australia. Parks Australia North.
- Stokes, T. (1988).** A review of the birds of Christmas Island, Indian Ocean. Australian National Parks and wildlife Service Occasional paper Number 16.
- BirdLife International (2014).** Species fact sheet: *Fregata andrewsi*.
- Ali, S. & S.D. Ripley (1983).** *A Pictorial Guide to the Birds of the Indian Subcontinent. 1st ed.* Oxford University Press, New Delhi.
- Prater, S.H. (1929).** Occurrence of the Christmas Island Frigatebird *Fregata andrewsi* on the west coast of India. *Journal of the Bombay Natural History Society* 33(2): 445–446.
- Abdulali, H. (1961).** The Christmas Island Frigatebird, *Fregata andrewsi* Mathews, in Indian waters - a correction. *Journal of the Bombay Natural History Society* 57(3): 667–668.
- Philips, W.W.A. (1953).** A revised checklist of Birds of Ceylon. A natural History Series (Zoology). The National Museums of Ceylon, Colombo.
- Saxena, A. (1994).** Sighting of Christmas Island Frigatebird *Fregata andrewsi* Mathews, in the Andamans. *Journal of the Bombay Natural History Society* 91(1): 138.
- Kumar, P.M. & P.M. Kumar (1997).** Occurrence of Christmas Frigatebird. *Newsletter for Birdwatchers* 36(6): 113–114.
- Pillai, N.G. (1964).** Occurrence of Christmas Frigatebird. *Fregata andrewsi* Mathews at Ernakulam. *Newsletter for Birdwatchers* 4(7): 4.
- Santharam, V. (1982).** Some rare encounters. *Newsletter for Birdwatchers* 22(5-6): 5–8.
- Dwarakanath, A. (1981).** Christmas Island Frigate Bird seen in Karnataka. *Newsletter for Birdwatchers* 21(7):16.
- Sen, S. (2011).** Pelagic Vagrants of East Coast. [www.kolkatabirds.com](http://www.kolkatabirds.com).
- Grimmett, R., C. Inskipp & T. Inskipp (2016).** *Birds of the Indian Subcontinent. 2nd ed.* Oxford University Press & Christopher Helm, London, 528 pp.
- Ramussen, P.C. & J.C. Anderton (2012).** *Birds of South Asia: the Ripley Guide. 2nd edition.*
- Ali, S. (1969).** *Birds of Kerala*. Oxford University Press, Delhi, 468 pp.
- eBird (2020).** eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. <http://www.ebird.org>. Accessed on 19.ix.2020.

**Acknowledgements:** We are very much grateful to David James who patiently examined the images to identify the bird. Thanks are also due to the range officer and staff in the Forest Office Kuttady for providing some information regarding their initiative to rescue the bird.

**Abdulla Paleri<sup>1</sup>, K.R. Aju<sup>2</sup> & E.V. Amal<sup>3</sup>**

<sup>1,3</sup> Edivettiyil House, Paleri, Kerala, India

<sup>2</sup> School of Marine Sciences, CUSAT, Kochi, 682016, Kerala, India

Email: <sup>1</sup>abdullapaleri@yahoo.com (corresponding author), <sup>2</sup>ajukrajuifs@gmail.com

**Citation:** Paleri, A., K.R. Aju & E.V. Amal (2022). Sighting of the Critically Endangered Christmas Island Frigatebird off Chombala Coast, Kerala. Bird-o-soar #111, In: *Zoo's Print* 37(3): 46–49.



# SOLITARY WASP, POTTER WASP

*Delta pyrifforme pyrifforme* (Fabricius, 1775)

K. Kiran Vati, Lecturer, St. Aloysius College  
(Autonomous). Department of Zoology  
Mangalore – 575 003, Karnataka, India.  
Email: kiranvatic@gmail.com

*Delta pyrifforme pyrifforme* (Fabricius, 1775) is also called potter wasp. *Delta pyrifforme pyrifforme* (Fabricius, 1775) is also called potter wasps or masons wasps. They belong to the subfamily Eumeninae of the family Vespidae. *Delta pyrifforme pyrifforme* is widespread. Its distribution is throughout India and has been recorded in most of the Indian states. These wasps play an important role in various ecological systems. They also contribute to pollination similar to the bees but are predominantly known for their importance in a natural system for controlling the population of other invertebrates by predation. Yet much other interaction with the environment is still unknown or unobserved. Solitary wasps under the subfamily Eumeninae of the family Vespidae are called potter wasp or mason wasps. Wasps belonging to this group are economically important as a predator of different insects.

Solitary wasps are an interesting subject for behaviour ecology studies for their nest construction behaviour. *Delta pyrifforme pyrifforme* is good architecture and builders in nature. Mud is used to construct nests, here the mud obtains the property of plasticity when mixed with a certain amount of water, due to which the wasp moulds the soft mud into the required shape and structure, on drying it hardens to give a durable shape. Over the past 200 years, the knowledge of Eumeninae biology is scarce and scattered throughout literature compared to other subfamilies like Polistinae and the Vespinae, these comprise the eusocial Vespids, (Carpenter, 1982; Picket and Carpenter 2010). However, the Eumeninae are valuable for studies, since their behaviour is solitary to almost primitive social, hence the evolution of eusociality (Herms et al 2013).



## ANT

(Probably *Technomyrmex* sp.)

As part of my ant exploration near to my house, I observed this beautiful black ant on the top of the bright pink flower. Closer look reveals that shining white pollens from the flower is attached to the body of ant and ant is moving from one flower to other flower in the same plant and later to it was moving to nearby plants also.

Even though many ants are crawling from one flower to another flower for nector, only few ant species help in pollination, specifically on tiny flowers.

Pollen grains of *boerhavia diffusa* flowers are observed on the body of this tiny shining black ant (probably *Technomyrmex* sp.). Approximate flower size ~5mm.

K. Sadheeskumar, 50, Periyagounder Nagar, Vinayakapuram North,  
Saravanampatti POST, Coimbatore 641035. Email: sadheeskumar@gmail.com



## GECKO IN A BARK

*Cnemaspis mysorensis* communal oviposition site inside the crevices of Mango tree.

In the month of October, a team of Teachers went to Seven minister quarters Bengaluru for administrative purposes. We were waiting for the minister to arrive, sitting under the Mango tree. The juvenile geckos on the bark of the tree caught my attention and I lost into observing. A small crevice around two meters above the ground. I happened to see another adult gecko (*Cnemaspis mysorensis*) resting inside with 15-16 eggs around it. The crevices are the home to these geckos and a communal egg-laying site. These geckos help in keeping the number of pests low in their vicinity. We can observe the mutual relationship between the tree and the gecko and keep the environment healthy and stable around them.

Anil Kulkarni, Asst Science Teacher  
Kitturu Rani Channamma Residential School  
Sindhanur, Dist.Raichur 584128, Karnataka  
Email: kulkarni.anil.93@gmail.com





# ZOO'S PRINT

Communicating science for conservation

## ZOO'S PRINT Publication Guidelines

We welcome articles from the conservation community of all SAARC countries, including Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka and other tropical countries if relevant to SAARC countries' problems and potential.

**Type** — Articles of semi-scientific or technical nature. News, notes, announcements of interest to conservation community and personal opinion pieces.

**Feature articles** — articles of a conjectural nature — opinions, theoretical, subjective.

**Case reports:** case studies or notes, short factual reports and descriptions.

**News and announcements** — short items of news or announcements of interest to zoo and wildlife community

## Cartoons, puzzles, crossword and stories

**Subject matter:** Captive breeding, (wild) animal husbandry and management, wildlife management, field notes, conservation biology, population dynamics, population genetics, conservation education and interpretation, wild animal welfare, conservation of flora, natural history and history of zoos. Articles on rare breeds of domestic animals are also considered.

**Source:** Zoos, breeding facilities, holding facilities, rescue centres, research institutes, wildlife departments, wildlife protected areas, bioparks, conservation centres, botanic gardens, museums, universities, etc. Individuals interested in conservation with information and opinions to share can submit articles ZOOS' PRINT magazine.

## Manuscript requirements

Articles should be typed into a Word format and emailed to [zooreach@zooreach.org](mailto:zooreach@zooreach.org). Avoid indents, all caps or any other fancy typesetting. You may send photos, illustrations, tables.

Articles which should contain citations should follow this guideline: a bibliography organized alphabetically and containing all details referred in the following style: surname, initial(s), year, title of the article, name of journal, volume, number, pages.

## Editorial details

Articles will be edited without consultation unless previously requested by the authors in writing. Authors should inform editors if the article has been published or submitted elsewhere for publication.

## Publication Information

### ZOO'S PRINT, ISSN 0973-2543

Published at: Coimbatore

Copyright: © Zoo Outreach Organisation

Owner: Zoo Outreach Organisation, 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road, Saravanampatti, Coimbatore, Tamil Nadu 641035, India.

Editor: Sanjay Molur

Associate Editor: R. Marimuthu

Managing Editors: Latha G. Ravikumar & B. Ravichandran

Editorial Assistant: S. Radhika

Copy Editor: Sapna Ramapriya

### Zoo Outreach Organisation Trust Committee and Sr. Staff

Managing Trustee: Late Sally R. Walker

Executive Director Trustee: R.V. Sanjay Molur

Finance Director Trustee: Latha G. Ravikumar

Scientist: B.A. Daniel

Researcher: R. Marimuthu, Priyanka Iyer

Other staff: B. Ravichandran, K. Geetha, S. Radhika, Arul Jagadish, K. Raveendran, S. Sarojamma

ZOO'S PRINT magazine is informal and newsy as opposed to a scientific publication. ZOO'S PRINT magazine sometimes includes semi-scientific and technical articles which are reviewed only for factual errors, not peer-reviewed.

### Address

Zoo Outreach Organisation

Post Box 5912, 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road, Saravanampatti, Coimbatore, Tamil Nadu 641035, India

Phone: +91 9385339862 & 9385339863

E-mail: [zooreach@zooreach.org](mailto:zooreach@zooreach.org)

Website: [www.zoosprint.zooreach.org](http://www.zoosprint.zooreach.org),

[www.zooreach.org](http://www.zooreach.org)





