

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/379308474>

Nurturing orphaned Indian Grey Wolf at Machia Biological Park, Jodhpur, India

Article in *Journal of Threatened Taxa* · March 2024

DOI: 10.11609/jott.8762.16.3.24979-24985

CITATION

1

READS

49

5 authors, including:



Hemsingh Gehlot

Jai Narain Vyas University

21 PUBLICATIONS 32 CITATIONS

SEE PROFILE



Tapan Adhikari

Jai Narain Vyas University

9 PUBLICATIONS 16 CITATIONS

SEE PROFILE



Gaurav Gaurav

Jai Narain Vyas University

3 PUBLICATIONS 1 CITATION

SEE PROFILE



Prakash Suthar

Jai Narain Vyas University

3 PUBLICATIONS 1 CITATION

SEE PROFILE

Journal of Threatened Taxa



Open Access

10.11609/jott.2024.16.3.24819-25018

www.threatenedtaxa.org

26 March 2024 (Online & Print)

16(3): 24819-25018

ISSN 0974-7907 (Online)

ISSN 0974-7893 (Print)

Building evidence
for conservation
globally for



years



Silver Jubilee Issue



ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

Publisher
Wildlife Information Liaison Development Society
www.wild.zooreach.org

Host
Zoo Outreach Organization
www.zooreach.org

43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore, Tamil Nadu 641006, India
Registered Office: 3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore, Tamil Nadu 641006, India
Ph: +91 9385339863 | www.threatenedtaxa.org
Email: sanjay@threatenedtaxa.org

EDITORS

Founder & Chief Editor

Dr. Sanjay Molur

Wildlife Information Liaison Development (WILD) Society & Zoo Outreach Organization (ZOO),
43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore, Tamil Nadu 641006, India

Deputy Chief Editor

Dr. Neelesh Dahanukar

Noida, Uttar Pradesh, India

Managing Editor

Mr. B. Ravichandran, WILD/ZOO, Coimbatore, Tamil Nadu 641006, India

Associate Editors

Dr. Mandar Paingankar, Government Science College Gadchiroli, Maharashtra 442605, India

Dr. Ulrike Streicher, Wildlife Veterinarian, Eugene, Oregon, USA

Ms. Priyanka Iyer, ZOO/WILD, Coimbatore, Tamil Nadu 641006, India

Dr. B.A. Daniel, ZOO/WILD, Coimbatore, Tamil Nadu 641006, India

Editorial Board

Dr. Russel Mittermeier

Executive Vice Chair, Conservation International, Arlington, Virginia 22202, USA

Prof. Mewa Singh Ph.D., FASc, FNA, FNAsc, FNAPsy

Ramanna Fellow and Life-Long Distinguished Professor, Biopsychology Laboratory, and
Institute of Excellence, University of Mysore, Mysuru, Karnataka 570006, India; Honorary
Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore; and Adjunct
Professor, National Institute of Advanced Studies, Bangalore

Stephen D. Nash

Scientific Illustrator, Conservation International, Dept. of Anatomical Sciences, Health Sciences
Center, T-8, Room 045, Stony Brook University, Stony Brook, NY 11794-8081, USA

Dr. Fred Pluthero

Toronto, Canada

Dr. Priya Davidar

Sigur Nature Trust, Chadapatti, Mavinahalla PO, Nilgiris, Tamil Nadu 643223, India

Dr. Martin Fisher

Senior Associate Professor, Battcock Centre for Experimental Astrophysics, Cavendish
Laboratory, JJ Thomson Avenue, Cambridge CB3 0HE, UK

Dr. John Fellowes

Honorary Assistant Professor, The Kadoorie Institute, 8/F, T.T. Tsui Building, The University of
Hong Kong, Pokfulam Road, Hong Kong

Prof. Dr. Mirco Solé

Universidade Estadual de Santa Cruz, Departamento de Ciências Biológicas, Vice-coordenador
do Programa de Pós-Graduação em Zoologia, Rodovia Ilhéus/Itabuna, Km 16 (45662-000)
Salobrinho, Ilhéus - Bahia - Brasil

Dr. Rajeev Raghavan

Professor of Taxonomy, Kerala University of Fisheries & Ocean Studies, Kochi, Kerala, India

English Editors

Mrs. Mira Bhojwani, Pune, India

Dr. Fred Pluthero, Toronto, Canada

Mr. P. Ilangoan, Chennai, India

Ms. Sindhura Stothra Bhashyam, Hyderabad, India

Web Development

Mrs. Latha G. Ravikumar, ZOO/WILD, Coimbatore, India

Typesetting

Mrs. Radhika, ZOO, Coimbatore, India

Mrs. Geetha, ZOO, Coimbatore India

Fundraising/Communications

Mrs. Payal B. Molur, Coimbatore, India

Subject Editors 2020–2022

Fungi

Dr. B. Shivaraju, Bengaluru, Karnataka, India

Dr. R.K. Verma, Tropical Forest Research Institute, Jabalpur, India

Dr. Vatsavaya S. Raju, Kakatiya University, Warangal, Andhra Pradesh, India

Dr. M. Krishnappa, Jnana Sahyadri, Kuvempu University, Shimoga, Karnataka, India

Dr. K.R. Sridhar, Mangalore University, Mangalagangothri, Mangalore, Karnataka, India

Dr. Gunjan Biswas, Vidyasagar University, Midnapore, West Bengal, India

Dr. Kiran Ramchandra Ranadive, Annasaheb Magar Mahavidyalaya, Maharashtra, India

Plants

Dr. G.P. Sinha, Botanical Survey of India, Allahabad, India

Dr. N.P. Balakrishnan, Ret. Joint Director, BSI, Coimbatore, India

Dr. Shonil Bhagwat, Open University and University of Oxford, UK

Prof. D.J. Bhat, Retd. Professor, Goa University, Goa, India

Dr. Ferdinando Boero, Università del Salento, Lecce, Italy

Dr. Dale R. Calder, Royal Ontario Museum, Toronto, Ontario, Canada

Dr. Cleofas Cervancia, Univ. of Philippines Los Baños College Laguna, Philippines

Dr. F.B. Vincent Florens, University of Mauritius, Mauritius

Dr. Merlin Franco, Curtin University, Malaysia

Dr. V. Irudayaraj, St. Xavier's College, Palayamkottai, Tamil Nadu, India

Dr. B.S. Kholia, Botanical Survey of India, Gangtok, Sikkim, India

Dr. Pankaj Kumar, Department of Plant and Soil Science, Texas Tech University, Lubbock, Texas, USA.

Dr. V. Sampath Kumar, Botanical Survey of India, Howrah, West Bengal, India

Dr. A.J. Solomon Raju, Andhra University, Visakhapatnam, India

Dr. Vijayasankar Raman, University of Mississippi, USA

Dr. B. Ravi Prasad Rao, Sri Krishnadevaraya University, Anantpur, India

Dr. K. Ravikumar, FRLHT, Bengaluru, Karnataka, India

Dr. Aparna Watve, Pune, Maharashtra, India

Dr. Qiang Liu, Xishuangbanna Tropical Botanical Garden, Yunnan, China

Dr. Noor Azhar Mohamed Shazili, Universiti Malaysia Terengganu, Kuala Terengganu, Malaysia

Dr. M.K. Vasudeva Rao, Shiv Ranjani Housing Society, Pune, Maharashtra, India

Prof. A.J. Solomon Raju, Andhra University, Visakhapatnam, India

Dr. Mandar Datar, Agharkar Research Institute, Pune, Maharashtra, India

Dr. M.K. Janarthanam, Goa University, Goa, India

Dr. K. Karthikeyan, Botanical Survey of India, India

Dr. Errol Vela, University of Montpellier, Montpellier, France

Dr. P. Lakshminarasimhan, Botanical Survey of India, Howrah, India

Dr. Larry R. Noblick, Montgomery Botanical Center, Miami, USA

Dr. K. Haridasan, Pallavur, Palakkad District, Kerala, India

Dr. Analinda Manila-Fajard, University of the Philippines Los Banos, Laguna, Philippines

Dr. P.A. Sinu, Central University of Kerala, Kasaragod, Kerala, India

Dr. Afroz Alam, Banasthali Vidyapith (accredited A grade by NAAC), Rajasthan, India

Dr. K.P. Rajesh, Zamorin's Guruvayurappan College, GA College PO, Kozhikode, Kerala, India

Dr. David E. Boufford, Harvard University Herbaria, Cambridge, MA 02138-2020, USA

Dr. Ritesh Kumar Choudhary, Agharkar Research Institute, Pune, Maharashtra, India

Dr. A.G. Pandurangan, Thiruvananthapuram, Kerala, India

Dr. Navendu Page, Wildlife Institute of India, Chandrabani, Dehradun, Uttarakhand, India

Dr. Kannan C.S. Warriar, Institute of Forest Genetics and Tree Breeding, Tamil Nadu, India

Invertebrates

Dr. R.K. Avasthi, Rohtak University, Haryana, India

Dr. D.B. Bastawade, Maharashtra, India

Dr. Partha Pratim Bhattacharjee, Tripura University, Suryamaninagar, India

Dr. Kailash Chandra, Zoological Survey of India, Jabalpur, Madhya Pradesh, India

Dr. Ansie Dippenaar-Schoeman, University of Pretoria, Queenswood, South Africa

Dr. Rory Dow, National Museum of Natural History Naturalis, The Netherlands

Dr. Brian Fisher, California Academy of Sciences, USA

Dr. Richard Gallon, Llandudno, North Wales, LL30 1UP

Dr. Hemant V. Ghate, Modern College, Pune, India

Dr. M. Monwar Hossain, Jahangirnagar University, Dhaka, Bangladesh

For Focus, Scope, Aims, and Policies, visit https://threatenedtaxa.org/index.php/JoTT/aims_scope
For Article Submission Guidelines, visit <https://threatenedtaxa.org/index.php/JoTT/about/submissions>
For Policies against Scientific Misconduct, visit https://threatenedtaxa.org/index.php/JoTT/policies_various

continued on the back inside cover

Cover: The breathtakingly beautiful Silver Jubilee cover of JoTT is done in color pencils and ink by the 13-year old darling, Elakshi Mahika Molur.



Nurturing orphaned Indian Grey Wolf at Machia Biological Park, Jodhpur, India

Hemsingh Gehlot¹ , Mahendra Gehlot² , Tapan Adhikari³ , Gaurav⁴ & Prakash Suthar⁵

^{1,3,4,5} Department of Zoology, Jai Narain Vyas University, New Pali Road, Jodhpur, Rajasthan 342001, India.

² Machia Biological Park, Jodhpur, Rajasthan, India.

¹gehloths@gmail.com (corresponding author), ²sdmgehlott@gmail.com, ³tapanedu@gmail.com, ⁴gauravranwa696@gmail.com,

⁵prakashjangid486@gmail.com

Abstract: The Indian Grey Wolf *Canis lupus pallipes* is an iconic species of grassland in India. It is a Schedule 1 species according to the Wildlife Protection Act, 1972 and CITES Appendix 1 species. In the absence of parental care, five wolf pups were rescued from Baavarla on 26 November 2020 and brought into Machia Biological Park for hand rearing. In the absence of colostrum, a milk replacer formula (PetLac) was provided to the pups. The pups were kept at an ambient room temperature of 101°F as an adjustment to their natural surroundings. Gripe water, Vitamin A, and multivitamins were administered orally. The temperature and body growth parameters were measured and recorded weekly. Rabies vaccine was administered in the 26th week from the date of rescue. The diet of the wolf was gradually changed and from the 37th week, raw meat was included in their diet. Antibiotics Ciplox-TZ (ciprofloxacin and tinidazole tablet) Brand-Cipla and SPORLAC-DS (lactic acid bacillus tablets 120M) Brand-sanzyme Ltd. were given periodically to restore the gut fauna of the pups.

Keywords: Captive, conservation, ex-situ, hand rearing, rehabilitation, rescue, Thar Desert, veterinary care, wolf, zoo.

Editor: Rajesh G. Jani, Anand Agricultural University, Anand, India.

Date of publication: 26 March 2024 (online & print)

Citation: Gehlot, H., M. Gehlot, T. Adhikari, Gaurav & P. Suthar (2024). Nurturing orphaned Indian Grey Wolf at Machia Biological Park, Jodhpur, India. *Journal of Threatened Taxa* 16(3): 24979–24985. <https://doi.org/10.11609/jott.8762.16.3.24979-24985>

Copyright: © Gehlot et al. 2024. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use, reproduction, and distribution of this article in any medium by providing adequate credit to the author(s) and the source of publication.

Funding: Authors had independently carried out this work. There is no involvement of any funding agencies.

Competing interests: The authors declare no competing interests.

Author details: HEMSINGH GEHLOT is working as director, Wildlife Research and Conservation Awareness Centre as well as assistant professor of Zoology Department at J. N Vyas University, Jodhpur of Rajasthan. He was member of SLSC, State Wildlife Board for Rajasthan and Health Advisory Committee of Machia Biological Park, Jodhpur. He obtained MSc and PhD degree of Zoology from Jai Narain Vyas University. MAHENDRA GEHLOT has worked as a contractual employee in the Wildlife Rescue and Rehabilitation Centre of Machia Biological Park, Jodhpur since last 15 years. He has carried out several rescue missions and helped conserving keystone species of the Thar landscape. He was also awarded by the collector, Jodhpur for his outstanding contribution in the field of Wildlife rescue and rehabilitation. TAPAN ADHIKARI is currently pursuing a PhD from the Department of Zoology at Jai Narain Vyas University, Jodhpur. He was a project fellow at the HRRL-funded research project and also worked as a SRF at the SERB-DST funded research project. He worked as a JRF at the North Eastern Space Application Center. GAURAV is currently working as SRF in the Department of Zoology, Jai Narain Vyas University, Jodhpur. He is working on the Indian Grey wolf in the Rajasthan. His research area includes conservation and ecology of wild fauna. He has successfully completed MSc in zoology from the Department of Zoology, JNVU. PRAKASH SUTHAR is a recipient of CSIR-JRF and currently working as SRF in the Department of Zoology, Jai Narain Vyas University, Jodhpur. He has successfully completed MSc in zoology from the Department of Zoology, JNVU. He is working on the faunal diversity of the Thar landscape. His interest lies in environment and conservation education.

Author contributions: Research design, concept & supervision—Hemsingh Gehlot Data collection and hand rearing—Mahendra Gehlot & Hemsingh Gehlot. Data analysis, literature search and manuscript preparation—Tapan Adhikari, Gaurav, Prakash Suthar & Hemsingh Gehlot.

Acknowledgements: Authors like to acknowledge CCF wildlife, DFO Jodhpur (Wildlife), and forest staff of Machiya Biological Park support during the study duration. The author extends special gratitude to Dr Shrawan Singh Rathore for his valuable suggestions for successful completion of this study.



INTRODUCTION

A total of eight wolves are in captivity in the Machia Biological Park, Jodhpur. Out of the total, five wolves are nurtured. Hand rearing wild animals is very demanding and should be performed in extraordinary circumstances. Infants require hand-rearing only if the mother dies or is unable to feed them. Similarly, in the absence of the mother, orphan, feral, sick, injured, or rescued infants need human intervention to grow and sustain themselves (Mohapatra et al. 2019). Hand-rearing varies from species to species. Five wolf cubs were rescued from Baavarla village on 26 November 2020. This paper puts forward an elaborative explanation for nurturing an Indian Grey Wolf pup. It also explains the veterinary assistance required from the neonatal stage to adulthood. Distributed widely across Eurasia and North America, the Grey Wolf *Canis lupus* is an iconic grassland species. The Indian Grey Wolf *Canis lupus pallipes* and the Mongolian/Himalayan Wolf *Canis lupus chanco* are among the subspecies of Grey Wolf distributed in India (Anonymous 2023). The Indian Peninsular Wolf or the Indian Grey Wolves *Canis Lupus pallipes* exhibit a wide distribution, ranging from India in the east to Turkey in the west, with populations reported from Pakistan, Iran, Syria, and Israel (Wildlife Institute of India 2017). The Indian Grey Wolves evolved to occupy diverse habitats and are the top predators of the arid, semi-arid, and Deccan plateau region (Jhala & Giles 1993; Singh & Kumara 2006). Andhra Pradesh, Karnataka, Maharashtra, Madhya Pradesh, Gujarat, Rajasthan, Orissa, Bihar, West Bengal, Uttar Pradesh, and Haryana are said to have isolated areas of Indian Grey Wolves (Singh & Kumara 2006). The wolf population in Asia is data deficient, endangered, and evolutionarily distinct (Hamid et al. 2019). Several attempts were made to assess the population and occupancy of Indian Grey Wolves (Jhala & Giles 1991; Kumar & Rahmani 1997; Singh & Kumara 2006; Karanth & Chellam 2009; Srivathsa et al. 2020). Estimates of earlier wolf populations, wolf ecology, and their habitat assessment were primarily based on surveys and local-level information from pastoralists (Jhala & Giles 1991; Kumar & Rahmani 1997). A recent study using camera traps and a review of literature have suggested the presence of 3,170 Grey Wolves across the Indian subcontinent (Jhala et al. 2022). The number of Indian Peninsular Wolves in the wild is equivalent to that of the royal Bengal Tigers *Panthera tigris* making it an Endangered species (Azad 2022). The Grey wolf is the least concerned species as per the IUCN Red List, CITES Appendix 1, and Schedule 1 species under the Wildlife

Protection Act, 1972. Despite the decreasing population of the Indian Peninsular Wolves, residents surrounding the habitat of the same don't share a good bond with the species (Aggarwal 2003). Livestock depredation is the root cause of human-wolf conflict over the Indian subcontinent (Krithivasan et al. 2009). India has 87 Grey Wolves in captivity (Wildlife Institute of India 2017).

MATERIAL AND METHODS

The villagers from the Baavarla had called and reported the presence of a wolf den with orphaned cubs to the Machia Rescue and Rehabilitation Centre. Team members from the centre rushed to the den site and kept the wolf pups under observation. After 72 hours, when confirmed that the mother was nowhere to be seen the rescued wolves were brought to the veterinary unit of Machia Biological Park. Separate units are available for treating different species groups like canid, avian felid, ungulate, primate, etc. The orphaned pups were quarantined for 15 days in the rescue ward of Machia Biological Park. Adjacent to the canid centre is a kraal which provides the pups for playing and recreation and natural bedding was provided to the growing pups. In the absence of colostrum, a milk replacer formula (PetLac) with 33% crude protein, 18% crude fat, 0.5% crude fiber, and 5% moisture commercially available closest to mothers' milk was provided to the pups. The composition of wolf milk is 23.6% solid, 9.6% fat, 9.2% protein, and 3.4% carbohydrate (Das et al. 2013; Mohapatra et al. 2019). Available literature on canids with special emphasis on wolves regarding housing, feeding schedules, diet, and veterinary needs were consulted and utilized for nursing and management of the pups. Body measurements and other physiological parameters are recorded weekly to ensure whether the pups were showing proper growth as per their age. Environmental parameters, viz., humidity, temperature, and moisture were maintained as required for the species using an air conditioner (Gehlot et al. 2020) and hygiene and biosafety measures were taken as much as possible as this is crucial while raising orphaned young animals. An assistant was appointed round the clock to look after pups in case emergency or complications arise. The assistant and the veterinary staff alongside the doctor were advised to keep off-hand until it is extremely necessary because excessive human habituation can cause behavioral issues during release into the wild (Palmer & Malone 2018; Hansen et al. 2022).

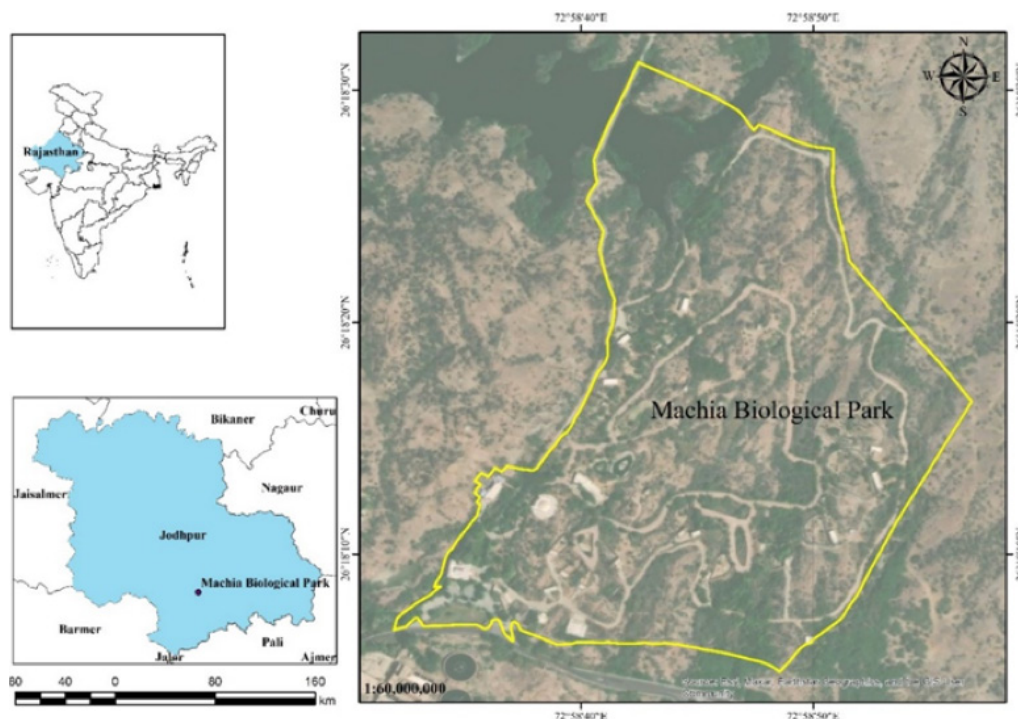


Image 1. Machia Biological Park.

Study Area

The Machia Biological Park is located on the western outskirts at the bank of Kaylana Lake of Jodhpur city at 26.3000 N & 72.9778 E. The park was founded on 13 February 2011 and subsequently old heritage zoo of Jodhpur was shifted here. The park encloses 41 ha of Machia forest block (680 ha), Jodhpur forest division. Under the Rajasthan Forest Act 1953, Machia forest block is protected as forest, notified vide notification number II 9(6), forest/90, dated 01/07/1990. The study area is undulating and the substratum is made of Rhyolite. The vegetation of the area consists of dry scrub forest with scanty tree cover of species like *Acacia senegal*, *Prosopis cineraria*, *Prosopis juliflora*, *Capparis decidua*, *Zizyphus nummularia*, and *Commiphora wightii*. The forest department has also planted several native species to increase tree cover inside the park. The park has 24 enclosures inhabited by several species of wild animals. Out of 24 enclosures, four are dedicated for big cats and canids, three for ungulates and deer, three for reptiles and avian species, two for bears and civets, and one each for porcupine, Jungle Cat, and Star Tortoises. Alongside the conservation, the park is well known for rescue and treatment of wildlife species under the wild animal rehabilitation program. "Recognition of Zoo Rules, 2009," also stated that zoos serve as an ideal place for nurturing the young of wild animals. From tourists'

viewpoint, tiger, lion, leopard, Sloth Bears, Himalayan bears, Indian Peninsular wolves, and Desert Cats are the major attractions of the Machia Biological Park.

RESULTS

Five wolf cubs were rescued on 26 November 2020 from an unattended den site on the outskirts of Baavarla village near the forest Boundary. The den resembles a step-less stair structure with a depth of 14 feet. The upper portion of the den is 1 m deep and the base of the den is 3.5 m deep. The den is a complex maze in the upper part. Two pups were residing in the upper part, and the rest were on the floor. The male-to-female ratio of the litter was 2:3. Observations of only one male and one female from the litter were recorded. All the pups were raised with identical conditions and procedures. The wolf pups were kept under observation in their den site for 72 hours prior to hand rearing. During the rescue, the pups were estimated to be around a month old. The pups were observed to have no apparent infection or injury, however, they were dehydrated and malnourished which could be attributed to the absence of mother's milk. The first day in the rescue centre is very critical as the cub has to adjust to its new surroundings. The cub was kept at an ambient room temperature of

101°F as an adjustment to their natural surroundings. 0.5 g of Rintose electrolyte diluted in 10 ml of water was provided twice in 24 hours to prevent dehydration on the day of rescue. Petlac, Hampshire, USA was bottle fed to the pups. From the date of rescue till the seventh week, 2 g in 10 ml of water was fed every day to the pups, subsequently after the 7th week till the 12th week, 4 g in 20 ml water was fed daily. The initial frequency of feeding was four times in 24 hours and was reduced to two times from 28th week. Along with petlac powder, 0.2 ml gripe water which serves as an antacid was also given to the pups. To supplement vitamins in the diet, Intavita syrup, and a Mecovet xl syrup was availed to the pups at 0.2 ml and 0.5 ml QD, respectively. Physical parameters of growth were recorded. Along with the multivitamin supplement, Caldipet syrup was given to the pups from the 15th week to the 33rd week, initially starting with 1 ml per day and subsequently increasing the dosage to 3 ml from the 27th week till the 33rd week. During the initial time of rescue, the temperature of the male was recorded to be 99.8°F and female 99.9°F. The temperature variation has also remained almost identical over 42 weeks. Similarly, at the initial time of rescue, the male weighed 600 g and female weighed 585 g. The mean weight and mean temperature of the litter during the initial time of rescue were 587.94 ± 11.10 g and 99.7 ± 0.05 °F respectively. Successive weekly variation in body weight was measured, recorded (Figure 1).

Combined vaccine Megvec-7 against leptospirosis, canine distemper, and parvovirus was administered in the mid of 20th week. Boiled eggs were introduced into the diet after the 08th week along with petlac powder for adjusting to new dietary habits. The weaning is progressive. In the mid of the 12th week, petlac powder was removed from the diet and two boiled eggs along with 25 ml chicken soup were introduced to the diet. This diet was maintained till the 17th week. On the 18th week, with three boiled eggs and 50 ml carabeef soups dietary increment was followed. The pups were responding very well to the dietary increment. From the 21st week, gripe water was removed from the diet because gastritis issues relating to feeding liquid food were over by then. In the 25th week, two tablets of Sporlac DS (1/4th) and Ciflox TZ (1/8th) were given once a day for three consecutive days to combat gastro-intestinal disorders. Sporlac DS helps in restoring normal microbial fauna of the intestine as it contains lactic acid Bacillus which is a probiotic. In the mid of the 26th week, the Rabigen mono vaccine was availed to the pups as a countermeasure for rabies. From the 34th week, the pups were given a kilo of boiled meat once a day during morning hours at 0930 h and in the

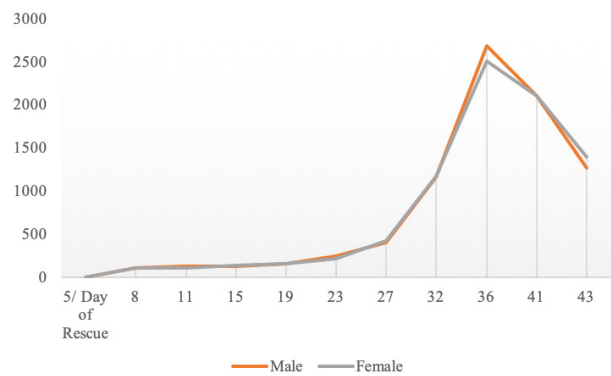


Figure 1. Weekly rate of change in weight of pups (in g). The successive change in weight shows exponential growth till the first 36th week and gradually decreases after it.

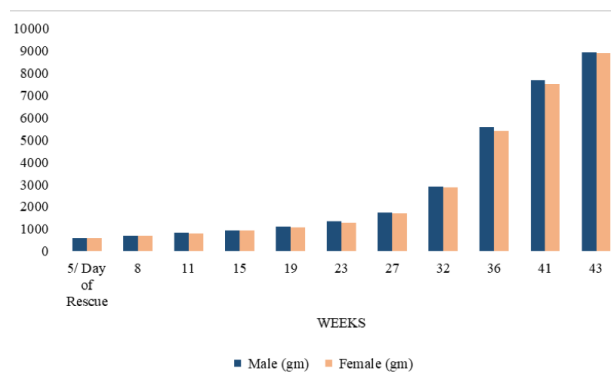


Figure 2. Weekly weight record of rescued pups.

37th week, boiled meat was replaced by raw carabeef. Along with feeding regime and schedule weekly body growth parameters viz. height, chest girth, cervical length, tail length, etc. were also recorded (Figures 2–4).

DISCUSSION

Literature on hand raising orphaned canids has been studied and followed to raise wolf pups into an adult. Hand-raising has been done in zoos in instances where the mother is unwilling to rear the young one or in circumstances in the wild where pups are being abandoned by the mother (Dhoot et al. 2003; Gehlot et al. 2020). Indian Peninsular Wolf or the Grey Wolf is the only sub-species of wolf that mates in winter (Jhala 2013). It has a gestation period of 62–63 days. The average litter size of pups ranges from four–six individuals (International Wolf Center 2022). In previous studies, pups were provided electrolytes to prevent dehydration as electrolytes are a great source of energy

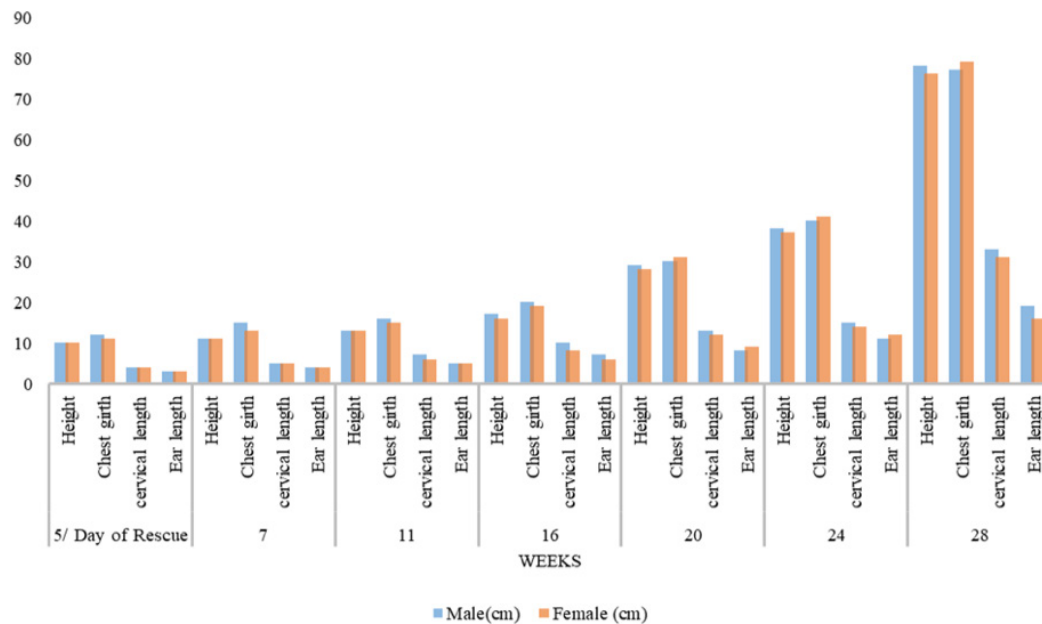


Figure 3. Weekly record of body growth parameters of rescued wolf pups.

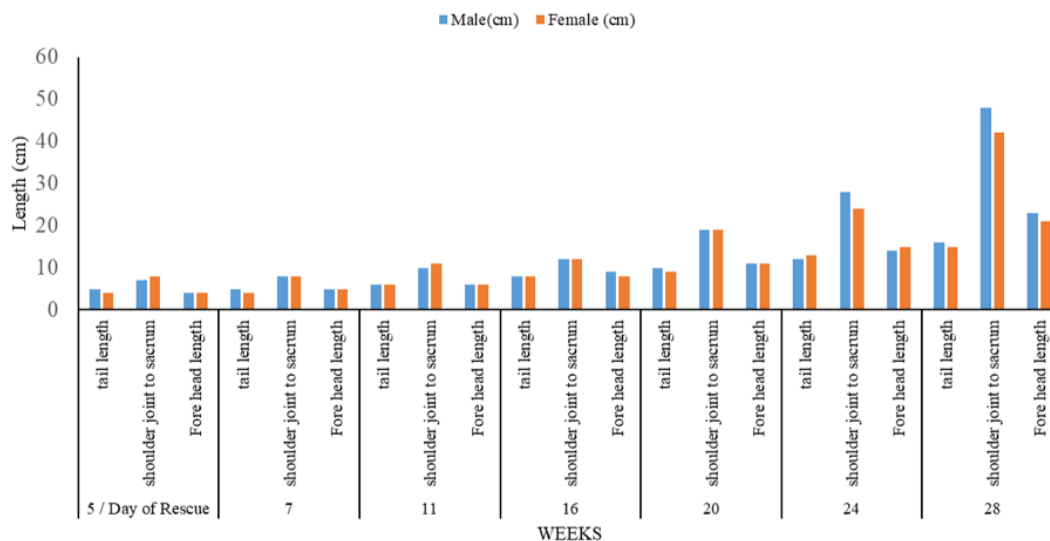


Figure 4. Weekly record of body growth parameters of rescued wolf pups.

and are easily digestible at any temperature. Commercial milk replacers were given and daily intake did not exceed 20% of body weight/day and was divided into frequent feedings (Nijboer 2020). Daily food intakes were recorded and changed progressively in hand-rearing (Dhoot et al. 2000). The Jackal *Canis aureus* shows a very close affinity to the Grey Wolf *Canis lupus* (Viranta et al. 2017). Four jackal pups were hand-reared at Maharajbag Zoo. The pups were given 30 ml of milk in the 1st week and 60 ml in the 6th week of growth. The amount was reduced to 25 ml at the end of the 10th week of growth. From the

4th week, a boiled egg was introduced to the feeding schedule. From the 8th week, two raw eggs and 30 g of raw kheema were introduced to their diet. The raw kheema was increased to 100 g in the 11th week (Dhoot et al. 2003). The weaning should be progressive and adjustable for wild cubs (Dhoot et al. 2003; Rivas et al. 2009). To restore gut fauna, tab Sporlac was introduced to the diet of leopard cubs at the Maharajbag Zoo (Dhoot et al. 2000). To combat vitamin and calcium deficiency, Ciflox TZ, Caldipet, Intavita syrup, and Mecovet XL syrup were used as supplementary diets (Gehlot et al. 2020).



Image 2. Rescue, feeding, housing, and morphological parameters of rescued Indian peninsular wolves. © Hemsingh Gehlot & Mahendra Gehlot.

In ex situ programs, mate selection should be carefully chosen for reproduction to maintain genetic variability within the wolf species. Field studies are very important for the conservation and relocation of captive animals in ex situ programs (Maia & Gouveia 2002).

CONCLUSION

Hand rearing involves the meticulous handling of premature wolf puppies that are only a few days old. They lack an efficient immune system. They can be nurtured carefully in a proper environment. The most important factor in nurturing an animal is its purpose, viz., captive breeding, reintroduction, and public display. Preserving natural behavior is an important aspect if an animal needs reintroduction. A good amount of time should be devoted to hand-rearing. The time, energy, and knowledge of the veterinarian and team who constantly efforts in the development of puppies relate to the success and failure in growth and reintroduction. The pups are now matured and thriving well in the captivity of Machia Biological Park of Jodhpur.

REFERENCES

- Aggarwal, R.K., J. Ramadevi & L. Singh (2003). Ancient origin and evolution of the Indian wolf: evidence from mitochondrial DNA typing of wolves from Trans-Himalayan region and Penninsular India. *Genome Biology* 4(6): 1–30. <https://doi.org/10.1186/gb-2003-4-6-p6>.
- Azad (2022). Wolves as endangered as tigers in India; only 3,100 left. The Times of India. http://timesofindia.indiatimes.com/articleshow/90553678.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst Electronic version accessed on 12 December 2022.
- Anonymous (2023). Canis. In: A. Bayani, R. Chakravarty, P. Roy, and K. Kunte. *Mammals of India*, v. 1.13. Downloaded on 12 April 2023. <http://www.mammalsofindia.org/tx/119-Canis>.
- Das, A., M. Saini, N. Datta, K. Sharma, S.K. Saha, B.C. Das, D. Swarup & A.K. Sharma (2013). Standardization of Animal Diets in Indian Zoos. In: Central Zoo Authority. Central Zoo Authority (Government of India). Downloaded on 12 April 2023. <https://cza.nic.in/uploads/documents/Research/IVRI%20animal%20diets.pdf>.
- Dhoot, V.M., S.V. Upadhye & M.R. Pande (2000). Successful handrearing of a leopard cub at Maharajbag Zoo. *Zoo's Print Journal* 15(8): 314–316. <https://doi.org/10.11609/JoTT.ZPJ.15.8.314-16>
- Dhoot, V.M., S.V. Upadhye, R.M. Zinjarde & M.R. Pande (2003). Handrearing of jackal (*Canis aureus*) at Maharajbag Zoo, Nagpur. *Zoo's Print journal* 18(1): 995–996. <https://doi.org/10.11609/JoTT.ZPJ.18.1.995-6>
- Gehlot, H.S., S.S. Rathore, T. Adhikari, Mahendra & V. Kachhwaha (2020). Successful Hand Rearing of an Asiatic Lion Cub at Machia Biological Park, Jodhpur, Rajasthan. *Ecology and Environmental Sciences* 8(3): 92–99.
- Hamid, A., T. Mahmood, H. Fatima, L.M. Hannelly, F. Akrim, A. Hussain & M. Waseem (2019). Origin, ecology and human conflict of Grey Wolf (*Canis lupus*) in Suleman Range, South Waziristan, Pakistan. *Mammalia* 83(6): 539–551. <https://doi.org/10.1515/mammalia-2018-0167>.
- Hansen, W.C., L. Larsson, P. Berner & H. Temrin (2022). Human-

- directed attachment behavior in wolves suggests standing ancestral variation for human–dog attachment bonds. *Ecology and Evolution* 12(9): e9299. <https://doi.org/10.1002/ece3.9299>
- Krithivasan, R., V. Athreya & M. Odden (2009). Human-wolf conflict in human dominated landscapes of Ahmednagar District, Maharashtra. Submitted to Rufford Small Grants Foundation for Nature Conservation. https://rufford.org.s3.amazonaws.com/media/project_reports/40.07.07%20Detailed%20Final%20Report%201.pdf Electronic version accessed 12 February 2022.
- International Wolf Center (2022). India at a glance. <https://wolf.org/> Electronic version accessed 12 February 2022.
- Jhala, Y.V. (eds) (2013). *Indian Wolf: Canis lupus pallipes*, Vol. 1. Hyderabad: Universities Press (India) Pvt Ltd.
- Jhala, Y.V. & R.H. Giles Jr (1991). The status and conservation of the wolf in Gujarat and Rajasthan, India. *Conservation Biology* 5(4): 476–483.
- Jhala, Y.V. & R.H. Giles (1993). The status and conservation of the wolf in Gujarat and Rajasthan, India. *Biological Conservation* 63(3): 276. [https://doi.org/10.1016/0006-3207\(93\)90769-w](https://doi.org/10.1016/0006-3207(93)90769-w)
- Jhala, Y., S. Saini, S. Kumar & Q. Qureshi (2022). Distribution, status, and conservation of the Indian Peninsular wolf. *Frontiers in Ecology and Evolution* 10: 814966. <https://www.frontiersin.org/articles/10.3389/fevo.2022.814966/full>
- Karanth, K.U. & R. Chellam (2009). Carnivore conservation at the crossroads. *Oryx* 43(1): 1–2.
- Kumar, S. & A.R. Rahmani (1997). Status of Indian grey wolf *Canis lupus pallipes* and its conservation in marginal agricultural areas of Solapur district, Maharashtra. *The Journal of the Bombay Natural History Society* 94: 466–472.
- Maia, O.B. & A.M.G. Gouveia (2002). Birth and mortality of maned wolves *Chrysocyon brachyurus* (Illiger, 1811) in captivity. *Brazilian Journal of Biology* 62: 25–32.
- Mohapatra, R.K., S.K. Sahu, J.K. Das & S. Paul (2019). Hand rearing of wild mammals in captivity. Nandankanan Biological Park, Forest and Environment Department, Government of Odisha, 80 pp.
- Nijboer, J. (2020). Handrearing Zoo Mammals. <https://www.msdevetmanual.com/management-and-nutrition/nutrition-exotic-and-zoo-animals/handrearing-zoo-mammals> Electronic version accessed on 12 December 2022.
- Palmer, A. & N. Malone (2018). Extending ethnoprimateology: Human–alloprimate relationships in managed settings. *International Journal of Primatology* 39: 831–851.
- Rivas, A., F. Martínez, I. Sánchez, J.M. Aguilar, M.A. Quevedo, J. Vergara, E. Vázquez, M. Cuadrado & A. Vargas (2009). *Hand-rearing of Iberian lynx cubs. Iberian Lynx Ex situ Conservation: An interdisciplinary approach*. Fundación Biodiversidad, Madrid, Spain, 16 pp.
- Singh, M. & H.N. Kumara (2006). Distribution, status and conservation of Indian grey wolf (*Canis lupus pallipes*) in Karnataka, India. *Journal of Zoology* 270(1): 164–169. <https://doi.org/10.1111/j.1469-7998.2006.00103.x>
- Srivathsa, A., I. Majgaonkar, S. Sharma, P. Singh, G.A. Punjabi, M.M. Chawla & A. Banerjee (2020). Opportunities for prioritizing and expanding conservation enterprise in India using a guild of carnivores as flagships. *Environmental Research Letters* 15(6): 1–11. <https://doi.org/10.1101/2020.01.03.894311>
- Viranta, S., A. Atickem, L. Werdelin & N.C. Stenseth (2017). Rediscovering a forgotten canid species. *BMC Zoology* 2: 1–9. <https://doi.org/10.1186/s40850-017-0015-0>
- Wildlife Institute of India (2017). *National Studbook of Indian Wolf (Canis lupus pallipes)*. Wildlife Institute of India, Dehradun and Central Zoo Authority, New Delhi, 76 pp.



Mr. Jatishwor Singh Irungbam, Biology Centre CAS, Branišovská, Czech Republic.
Dr. Ian J. Kitching, Natural History Museum, Cromwell Road, UK
Dr. George Mathew, Kerala Forest Research Institute, Peechi, India
Dr. John Noyes, Natural History Museum, London, UK
Dr. Albert G. Orr, Griffith University, Nathan, Australia
Dr. Sameer Padhye, Katholieke Universiteit Leuven, Belgium
Dr. Nancy van der Poorten, Toronto, Canada
Dr. Kareen Schnabel, NIWA, Wellington, New Zealand
Dr. R.M. Sharma, (Retd.) Scientist, Zoological Survey of India, Pune, India
Dr. Manju Siliwal, WILD, Coimbatore, Tamil Nadu, India
Dr. G.P. Sinha, Botanical Survey of India, Allahabad, India
Dr. K.A. Subramanian, Zoological Survey of India, New Alipore, Kolkata, India
Dr. P.M. Sureshan, Zoological Survey of India, Kozhikode, Kerala, India
Dr. R. Varatharajan, Manipur University, Imphal, Manipur, India
Dr. Eduard Vives, Museu de Ciències Naturals de Barcelona, Terrassa, Spain
Dr. James Young, Hong Kong Lepidopterists' Society, Hong Kong
Dr. R. Sundararaj, Institute of Wood Science & Technology, Bengaluru, India
Dr. M. Nithyanandan, Environmental Department, La Ala Al Kuwait Real Estate. Co. K.S.C., Kuwait
Dr. Himender Bharti, Punjabi University, Punjab, India
Mr. Purnendu Roy, London, UK
Dr. Saito Motoki, The Butterfly Society of Japan, Tokyo, Japan
Dr. Sanjay Sondhi, TITLI TRUST, Kalpavriksh, Dehradun, India
Dr. Nguyen Thi Phuong Lien, Vietnam Academy of Science and Technology, Hanoi, Vietnam
Dr. Nitin Kulkarni, Tropical Research Institute, Jabalpur, India
Dr. Robin Wen Jiang Ngiam, National Parks Board, Singapore
Dr. Lionel Monod, Natural History Museum of Geneva, Genève, Switzerland.
Dr. Asheesh Shivam, Nehru Gram Bharti University, Allahabad, India
Dr. Rosana Moreira da Rocha, Universidade Federal do Paraná, Curitiba, Brasil
Dr. Kurt R. Arnold, North Dakota State University, Saxony, Germany
Dr. James M. Carpenter, American Museum of Natural History, New York, USA
Dr. David M. Claborn, Missouri State University, Springfield, USA
Dr. Kareen Schnabel, Marine Biologist, Wellington, New Zealand
Dr. Amazonas Chagas Júnior, Universidade Federal de Mato Grosso, Cuiabá, Brasil
Mr. Monsoon Jyoti Gogoi, Assam University, Silchar, Assam, India
Dr. Heo Chong Chin, Universiti Teknologi MARA (UiTM), Selangor, Malaysia
Dr. R.J. Shiel, University of Adelaide, SA 5005, Australia
Dr. Siddharth Kulkarni, The George Washington University, Washington, USA
Dr. Priyadarsanan Dharma Rajan, ATREE, Bengaluru, India
Dr. Phil Alderslade, CSIRO Marine And Atmospheric Research, Hobart, Australia
Dr. John E.N. Veron, Coral Reef Research, Townsville, Australia
Dr. Daniel Whitmore, State Museum of Natural History Stuttgart, Rosenstein, Germany.
Dr. Yu-Feng Hsu, National Taiwan Normal University, Taipei City, Taiwan
Dr. Keith V. Wolfe, Antioch, California, USA
Dr. Siddharth Kulkarni, The Hormiga Lab, The George Washington University, Washington, D.C., USA
Dr. Tomas Ditrich, Faculty of Education, University of South Bohemia in Ceske Budejovice, Czech Republic
Dr. Mihaly Foldvari, Natural History Museum, University of Oslo, Norway
Dr. V.P. Uniyal, Wildlife Institute of India, Dehradun, Uttarakhand 248001, India
Dr. John T.D. Caleb, Zoological Survey of India, Kolkata, West Bengal, India
Dr. Priyadarsanan Dharma Rajan, Ashoka Trust for Research in Ecology and the Environment (ATREE), Royal Enclave, Bangalore, Karnataka, India

Fishes

Dr. Neelesh Dahanukar, IISER, Pune, Maharashtra, India
Dr. Topiltzin Contreras MacBeath, Universidad Autónoma del estado de Morelos, México
Dr. Heok Hee Ng, National University of Singapore, Science Drive, Singapore
Dr. Rajeev Raghavan, St. Albert's College, Kochi, Kerala, India
Dr. Robert D. Sluka, Chiltern Gateway Project, A Rocha UK, Southall, Middlesex, UK
Dr. E. Vivekanandan, Central Marine Fisheries Research Institute, Chennai, India
Dr. Davor Zanella, University of Zagreb, Zagreb, Croatia
Dr. A. Biju Kumar, University of Kerala, Thiruvananthapuram, Kerala, India
Dr. Akhilesh K.V., ICAR-Central Marine Fisheries Research Institute, Mumbai Research Centre, Mumbai, Maharashtra, India
Dr. J.A. Johnson, Wildlife Institute of India, Dehradun, Uttarakhand, India
Dr. R. Ravinesh, Gujarat Institute of Desert Ecology, Gujarat, India

Amphibians

Dr. Sushil K. Dutta, Indian Institute of Science, Bengaluru, Karnataka, India
Dr. Annemarie Ohler, Muséum national d'Histoire naturelle, Paris, France

Reptiles

Dr. Gernot Vogel, Heidelberg, Germany
Dr. Raju Vyas, Vadodara, Gujarat, India
Dr. Pritpal S. Soorae, Environment Agency, Abu Dubai, UAE.
Prof. Dr. Wayne J. Fuller, Near East University, Mersin, Turkey
Prof. Chandrashekher U. Rivonker, Goa University, Taleigao Plateau, Goa. India
Dr. S.R. Ganesh, Chennai Snake Park, Chennai, Tamil Nadu, India
Dr. Himansu Sekhar Das, Terrestrial & Marine Biodiversity, Abu Dhabi, UAE

Birds

Dr. Hem Sagar Baral, Charles Sturt University, NSW Australia
Mr. H. Byju, Coimbatore, Tamil Nadu, India
Dr. Chris Bowden, Royal Society for the Protection of Birds, Sandy, UK
Dr. Priya Davidar, Pondicherry University, Kalapet, Puducherry, India
Dr. J.W. Duckworth, IUCN SSC, Bath, UK
Dr. Rajah Jayapal, SAGON, Coimbatore, Tamil Nadu, India
Dr. Rajiv S. Kalsi, M.L.N. College, Yamuna Nagar, Haryana, India
Dr. V. Santharam, Rishi Valley Education Centre, Chittoor Dt., Andhra Pradesh, India
Dr. S. Balachandran, Bombay Natural History Society, Mumbai, India
Mr. J. Praveen, Bengaluru, India
Dr. C. Srinivasulu, Osmania University, Hyderabad, India
Dr. K.S. Gopi Sundar, International Crane Foundation, Baraboo, USA
Dr. Gombobaatar Sunde, Professor of Ornithology, Ulaanbaatar, Mongolia
Prof. Reuven Yosef, International Birding & Research Centre, Eilat, Israel
Dr. Taej Mundkur, Wetlands International, Wageningen, The Netherlands
Dr. Carol Inskipp, Bishop Auckland Co., Durham, UK
Dr. Tim Inskipp, Bishop Auckland Co., Durham, UK
Dr. V. Gokula, National College, Tiruchirappalli, Tamil Nadu, India
Dr. Arkady Lelej, Russian Academy of Sciences, Vladivostok, Russia
Dr. Simon Dowell, Science Director, Chester Zoo, UK
Dr. Mário Gabriel Santiago dos Santos, Universidade de Trás-os-Montes e Alto Douro, Quinta de Prados, Vila Real, Portugal
Dr. Grant Connette, Smithsonian Institution, Royal, VA, USA
Dr. P.A. Azeez, Coimbatore, Tamil Nadu, India

Mammals

Dr. Giovanni Amori, CNR - Institute of Ecosystem Studies, Rome, Italy
Dr. Anwaruddin Chowdhury, Guwahati, India
Dr. David Mallon, Zoological Society of London, UK
Dr. Shomita Mukherjee, SAGON, Coimbatore, Tamil Nadu, India
Dr. Angie Appel, Wild Cat Network, Germany
Dr. P.O. Nameer, Kerala Agricultural University, Thrissur, Kerala, India
Dr. Ian Redmond, UNEP Convention on Migratory Species, Lansdown, UK
Dr. Heidi S. Riddle, Riddle's Elephant and Wildlife Sanctuary, Arkansas, USA
Dr. Karin Schwartz, George Mason University, Fairfax, Virginia.
Dr. Lala A.K. Singh, Bhubaneswar, Orissa, India
Dr. Mewa Singh, Mysore University, Mysore, India
Dr. Paul Racey, University of Exeter, Devon, UK
Dr. Honnavalli N. Kumara, SAGON, Anaikatty P.O., Coimbatore, Tamil Nadu, India
Dr. Nishith Dharaiya, HNG University, Patan, Gujarat, India
Dr. Spartaco Gippoliti, Socio Onorario Società Italiana per la Storia della Fauna "Giuseppe Altobello", Rome, Italy
Dr. Justus Joshua, Green Future Foundation, Tiruchirappalli, Tamil Nadu, India
Dr. H. Raghuram, The American College, Madurai, Tamil Nadu, India
Dr. Paul Bates, Harison Institute, Kent, UK
Dr. Jim Sanderson, Small Wild Cat Conservation Foundation, Hartford, USA
Dr. Dan Challender, University of Kent, Canterbury, UK
Dr. David Mallon, Manchester Metropolitan University, Derbyshire, UK
Dr. Brian L. Cypher, California State University-Stanislaus, Bakersfield, CA
Dr. S.S. Talmale, Zoological Survey of India, Pune, Maharashtra, India
Prof. Karan Bahadur Shah, Budhanilakantha Municipality, Kathmandu, Nepal
Dr. Susan Cheyne, Borneo Nature Foundation International, Palangkaraja, Indonesia
Dr. Hemanta Kafley, Wildlife Sciences, Tarleton State University, Texas, USA

Other Disciplines

Dr. Aniruddha Belsare, Columbia MO 65203, USA (Veterinary)
Dr. Mandar S. Paingankar, University of Pune, Pune, Maharashtra, India (Molecular)
Dr. Jack Tordoff, Critical Ecosystem Partnership Fund, Arlington, USA (Communities)
Dr. Ulrike Streicher, University of Oregon, Eugene, USA (Veterinary)
Dr. Hari Balasubramanian, EcoAdvisors, Nova Scotia, Canada (Communities)
Dr. Rayanna Hellem Santos Bezerra, Universidade Federal de Sergipe, São Cristóvão, Brazil
Dr. Jamie R. Wood, Landcare Research, Canterbury, New Zealand
Dr. Wendy Collinson-Jonker, Endangered Wildlife Trust, Gauteng, South Africa
Dr. Rajeshkumar G. Jani, Anand Agricultural University, Anand, Gujarat, India
Dr. O.N. Tiwari, Senior Scientist, ICAR-Indian Agricultural Research Institute (IARI), New Delhi, India
Dr. L.D. Singla, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India
Dr. Rupika S. Rajakaruna, University of Peradeniya, Peradeniya, Sri Lanka
Dr. Bahar Baviskar, Wild-CER, Nagpur, Maharashtra 440013, India

Reviewers 2020–2022

Due to pausity of space, the list of reviewers for 2020–2022 is available online.

The opinions expressed by the authors do not reflect the views of the Journal of Threatened Taxa, Wildlife Information Liaison Development Society, Zoo Outreach Organization, or any of the partners. The journal, the publisher, the host, and the partners are not responsible for the accuracy of the political boundaries shown in the maps by the authors.

Print copies of the Journal are available at cost. Write to:
The Managing Editor, JoTT,
c/o Wildlife Information Liaison Development Society,
43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore,
Tamil Nadu 641006, India
ravi@threatenedtaxa.org

Journal of Threatened Taxa is indexed/abstracted in Bibliography of Systematic Mycology, Biological Abstracts, BIOSIS Previews, CAB Abstracts, EBSCO, Google Scholar, Index Copernicus, Index Fungorum, JournalSeek, National Academy of Agricultural Sciences, NewJour, OCLC WorldCat, SCOPUS, Stanford University Libraries, Virtual Library of Biology, Zoological Records.

NAAS rating (India) 5.64



OPEN ACCESS



The Journal of Threatened Taxa (JoTT) is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use, reproduction, and distribution of articles in any medium by providing adequate credit to the author(s) and the source of publication.

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

March 2024 | Vol. 16 | No. 3 | Pages: 24819–25018

Date of Publication: 26 March 2024 (Online & Print)

DOI: 10.11609/jott.2024.16.3.24819-25018

www.threatenedtaxa.org

Editorial

Celebrating 25 years of building evidence for conservation

– Sanjay Molur, Pp. 24819–24820

Articles

Identifying plants for priority conservation in Samar Island Natural Park forests (the Philippines) over limestone using a localized conservation priority index

– Inocencio Escoton Buot, Jr., Marne Ga Origenes, Ren Divien Del Rosario Obeña, Jonathan O. Hernandez, Noba F. Hilvano, Diana Shane A. Balindo & Edelyn O. Echapare, Pp. 24821–24837

Status of floristic diversity and impact of development on two sacred groves from Maval Tehsil (Maharashtra, India) after a century

– Kishor Himmat Saste & Rani Babanrao Bhagat, Pp. 24838–24853

Faunal inventory and illustrated taxonomic keys to aquatic Coleoptera (Arthropoda: Insecta) of the northern Western Ghats of Maharashtra, India

– Sayali D. Sheth, Anand D. Padhye & Hemant V. Ghate, Pp. 24854–24880

Communications

A checklist of wild mushroom diversity in Mizoram, India

– Rajesh Kumar & Girish Gogoi, Pp. 24881–24898

New plant records for the flora of Saudi Arabia

– Abdul Wali Al-Khulaidi, Ali M. Alzahrani, Ali A. Al-Namazi, Eisa Ali Al-Faify, Mohammed Musa Alfaifi, Nageeb A. Al-Sagheer & Abdul Nasser Al-Gifri, Pp. 24899–24909

Seagrass ecosystems of Ritche's Archipelago in the Andaman Sea harbor 'Endangered' *Holothuria scabra* Jaeger, 1833 and 'Vulnerable' *Actinopyga mauritiana* (Quoy & Gaimard, 1834) sea cucumber species (Echinodermata: Holothuroidea)

– Amrit Kumar Mishra, R. Raihana, Dilmani Kumari & Syed Hilal Farooq, Pp. 24910–24915

Stypopodium Kütz. - a new generic record for India from the Bay of Bengal

– Y. Aron Santhosh Kumar, M. Palanisamy & S. Vivek, Pp. 24916–24922

First report of *Macrochaetus sericus* Thorpe, 1893 and *Lecane tenuiseta* Haring, 1914 (Rotifera: Monogononta) from Jammu waters (J&K), India

– Deepanjali Slathia, Supreet Kour & Sarbjeet Kour, Pp. 24923–24929

Spider diversity (Arachnida: Araneae) at Saurashtra University Campus, Rajkot, Gujarat during the monsoon

– Jyotil K. Dave & Varsha M. Trivedi, Pp. 24930–24941

Records of three gobioid fishes (Actinopterygii: Gobiiformes: Gobiidae) from the Gujarat coast, India

– Piyush Vadher, Hitesh Kardani, Prakash Bambhaniya & Imtiyaz Beleem, Pp. 24942–24948

Species distribution modelling of Baya Weaver *Ploceus philippinus* in Nagaon District of Assam, India: a zoogeographical analysis

– Nilotpal Kalita, Neeraj Bora, Sandip Choudhury & Dhruvaji Saharia, Pp. 24949–24955

Diversity and species richness of avian fauna in varied habitats of Soraipung range and vicinity in Dehing Patkai National Park, India

– Anubhav Bhuyan, Shilpa Baidya, Nayan Jyoti Hazarika, Sweeta Sumant, Bijay Thakur, Amit Prakash, Nirmali Gogoi, Sumi Handique & Ashalata Devi, Pp. 24956–24966

D'Ering Memorial Wildlife Sanctuary, a significant flyway and a preferred stopover (refuelling) site during the return migration of the Amur Falcon *Falco amurensis* (Radde, 1863)

– Tapak Tamir, Abprez Thungwon Kimsing & Daniel Mize, Pp. 24967–24972

Breeding of the 'Critically Endangered' White-rumped Vulture *Gyps bengalensis* in the Shan Highlands, Myanmar

– Sai Sein Lin Oo, Nang Lao Kham, Marcela Suarez-Rubio & Swen C. Renner, Pp. 24973–24978

Nurturing orphaned Indian Grey Wolf at Machia Biological Park, Jodhpur, India

– Hemsingh Gehlot, Mahendra Gehlot, Tapan Adhikari, Gaurav & Prakash Suthar, Pp. 24979–24985

Short Communications

New records of forty-nine herbaceous plant species from lateritic plateaus for Ratnagiri District of Maharashtra, India

– D.B. Borude, P.P. Bhalekar, A.S. Pansare, K.V.C. Gosavi & A.N. Chandore, Pp. 24986–24991

First report of moth species of the family Tineidae (Lepidoptera) in regurgitated pellets of harriers in India

– S. Thalavaipandi, Arjun Kannan, M.B. Prashanth & T. Ganesh, Pp. 24992–24995

Notes

Capturing the enchanting glow: first-ever photographs of bioluminescent mushroom *Mycena chlorophos* in Tamil Nadu, India

D. Jude, Vinod Sadhasivan, M. Ilayaraja & R. Amirtha Balan, Pp. 24996–24998

Extended distribution of *Clematis wightiana* Wall. (Ranunculaceae) in the Indian State of Arunachal Pradesh – a hitherto endemic species of the Western Ghats, India

– Debasmita Dutta Pramanick & Manas Bhaumik, Pp. 24999–25002

Smilax borneensis A.DC. (Smilacaceae): an addition to the flora of India

– Kishor Deka, Sagarika Das & Bhaben Tanti, Pp. 25003–25005

Recent record of True Giant Clam *Tridacna gigas* from the Sulu Archipelago and insight into the giant clam fisheries and conservation in the southernmost islands of the Philippines

– Richard N. Muallil, Akkil S. Injani, Yennyriza T. Abduraup, Fauriza J. Saddari, Ebrahim R. Ondo, Alimar J. Sakilan, Mohammad Gafor N. Hapid & Haidisheena A. Allama, Pp. 25006–25009

A record of the Hoary Palmer *Unkana ambasa* (Moore, [1858]) (Insecta: Lepidoptera: Hesperidae) from Assam, India

– Sanath Chandra Bohra, Manmath Bharali, Puja Kalita & Rita Roy, Pp. 25010–25012

Sighting of Large Branded Swift *Pelopidas sinensis* (Mabille, 1877) (Hesperidae: Hesperinae) in Delhi, India

– Rajesh Chaudhary & Sohail Madan, Pp. 25013–25015

Rodent - a part of culture and revolution in India

– Hiranmoy Chetia & Murali Krishna Chatakonda, Pp. 25016–25018

Publisher & Host



Threatened Taxa