

Building evidence for conservation globally

Journal of Threatened Taxa

10.11609/jott.2023.15.8.23631-23826

www.threatenedtaxa.org

26 August 2023 (Online & Print)

15(8): 23631-23826

ISSN 0974-7907 (Online)

ISSN 0974-7893 (Print)



Open Access





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: Coromandal Sacred Langur *Semnopithecus priam* - made with acrylic paint. © P. Kritika.



Preference of *Helopsaltes pleskei* (Taczanowski, 1890) (Aves: Passeriformes: Locustellidae) on uninhabited islets (Chengdo, Jikgudo, and Heukgeomdo) in South Korea as breeding sites

Young-Hun Jeong¹ , Sung-Hwan Choi² , Seon-Mi Park³ , Jun-Won Lee⁴ & Hong-Shik Oh⁵

^{1,2,5} Interdisciplinary Graduate Program in Advanced Convergence Technology and Science, Jeju National University, Jeju Special Self-Governing Province, Jeju-si 63243, Republic of Korea.

³ Research Institute for Basic Sciences, Jeju National University, Jeju Special Self-Governing Province, Jeju-si 63243, Republic of Korea.

^{4,5} Faculty of Science Education, Jeju National University, Jeju Special Self-Governing Province, Jeju-si 63243, Republic of Korea.

¹ jyh6156@naver.com, ² sung_1220@naver.com, ³ psm0624@naver.com, ⁴ dlwnsdnjs70s@naver.com,

⁵ sciedu@jejunu.ac.kr (corresponding author)

Abstract: This study was conducted to investigate the habitat and breeding status of the Pleske's 22 Grasshopper Warbler *Helopsaltes pleskei* inhabiting unmanned coastal islets (Cheongdo, Jikgudo and Heukgeomdo) on the Jeju Chuja Marine Provincial Park in South Korea. A total of 13 nesting sites were observed between April 2019 and April 2021. On Cheongdo Islet, nests were located as follows: four in *C. japonica*, one in *P. thunbergii*, and one in *Eurya emarginata*. On Jikgudo Islet, four nests were distributed with two in *C. japonica*, one in *P. thunbergii*, and one in *E. macrophylla*. Meanwhile, on Heukgeomdo islet, three nests were located, all in *C. japonica*. During the study period, 36 individuals were observed: 14 in Cheongdo, 10 in Jikgudo and 12 in the Heukgeomdo Islets. Most nesting sites were located in the bushy areas of the inner islets. Thus, birds tended to select nesting locations in response to predation and microclimates to increase reproductive rates and maximize offspring survival. This study highlights the importance of unmanned islands (islets) and the presence of bushy shrubs as important nesting and hiding sites for the ecologically vulnerable Pleske's Grasshopper Warbler.

Keywords: Defence mechanism, habitat environment, Korean Peninsula, Pleske's Grasshopper Warbler, Red List species, vegetation.

Editor: H. Byju, Coimbatore, Tamil Nadu, India.

Date of publication: 26 August 2023 (online & print)

Citation: Jeong, Y.-H., S.-H. Choi, S.-M. Park, J.-W. Lee & H.-S. Oh (2023). Preference of *Locustella pleskei* (Taczanowski, 1890) (Aves: Passeriformes: Locustellidae) on uninhabited islets (Chengdo, Jikgudo, and Heukgeomdo) in South Korea as breeding sites. *Journal of Threatened Taxa* 15(8): 23675–23680. <https://doi.org/10.11609/jott.8263.15.8.23675-23680>

Copyright: © Jeong et al. 2023. 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: None.

Competing interests: The authors declare no competing interests.

Author details: YOUNG-HUN JEONG and SUNG-HWAN CHOI are doctoral candidates specializing in ecology at Jeju National University. Young-Hun Jeong's research centers on the circadian rhythms of mammals and birds, and he is actively involved in bird monitoring and habitat surveys. Sung-Hwan Choi delves into the impact of alien species on the uninhabited islands of Jeju, emphasizing the ecological changes these species induce. DR. SEON-MI PARK serves as a postdoctoral researcher at Jeju National University. Renowned for her expertise in molecular and animal ecology, she has published extensively in international academic journals, primarily focusing on invasive animal species. DR. JUN-WON LEE has undertaken comprehensive research on the rodents of Jeju Island, earning his doctoral degree from Jeju National University. PROFESSOR HONG-SHIK OH has made seminal contributions to the field of ecology in South Korea. His areas of expertise encompass wildlife ecology, molecular ecology, genetics, and conservation biology.

Author contributions: YHJ drafted the original manuscript, while both YHJ and SHC conceptualized the study and designed the field methodology. YHJ, SHC, SMP, and JWL conducted the field study, collecting data, and performing the analysis. HSO reviewed and provided edits to the original manuscript.

Acknowledgements: The author is grateful to the traditional healers and other knowledgeable ethnic people of the studied area who have participated in the field survey and provided valuable information of ethnomedicinal pteridophytes. The author is also grateful to the Principal, A.B.N. Seal College, Cooch Behar, for providing necessary facilities. This work is supported by the grant (Memo No: 682/(Sanc.)/BT/ST/P/S&T/2G-01/2020 dated 04/01/2021) from the Department of Science & Technology and Biotechnology (DSTBT), Government of West Bengal, under the Research and Development Programmes scheme named as Gobeshonay Bangla. The author is sincerely indebted to the anonymous reviewers and subject editor for providing valuable suggestions. Sincere thanks to Mr. C.R. Fraser-Jenkins, Kathmandu, Nepal, and Cascais, Portugal, for his support in the identification of the species and valuable suggestions during revision of the manuscript.

INTRODUCTION

Pleske's Grasshopper Warbler *Helopsaltes pleskei* is a species of Passeriformes, and is 17 cm long, with a greyish brown or olive brown back and white belly (Birdlife International 2001). The light brownish-white eyebrow line is unclear, the tail is round and small white spots at the end are observed and the legs are pale apricot (Fujita et al. 2005). Its appearance is similar to that of *Locustella ochotensis* and it feeds on insects, spiders, and gastropods (Lee et al. 2020). The Pleske's Grasshopper Warbler lays three to six eggs in reed fields, bamboo forests, and shrubberies around the coast between mid-May and August and builds rice bowl-shaped nests on shrub stems such as that of *Camellia japonica* and *Pittosporum tobira* (Brazil 2009).

The Pleske's Grasshopper Warbler is an extremely rare bird, with an estimated 2,500–10,000 individuals remaining worldwide. It is an internationally protected species classified as 'Vulnerable' (VU) as per the IUCN Red List and is also designated as belonging to endangered wildlife class II in South Korea (NIBR 2019). It breeds locally on the islands and coasts of far east Russia, Japan, and China, including the Korean Peninsula. Vietnam and Hong Kong are migratory locations (Qiao et al. 2006). Its habitat is usually an area in the shrubberies or wetlands located in temperate and subtropical climates, and fewer than 100 pairs of Pleske's Grasshopper Warblers are estimated to breed in Korea (Birdlife International 2001). It breeds mainly on uninhabited islands such as Hongdo, Chilbaldo and Sasudo Islets in South Korea (Choi et al. 2017). Habitat reduction and loss due to development are the main factors that have led to a decrease in the population of the Pleske's Grasshopper Warblers; however, no specific basis for this population reduction has been revealed yet (Takaki et al. 2001).

The records of this species were majorly based on past reports, and no field surveys have been conducted since 2016. Such information gaps also have significant conservation implications as they critically undermine the efforts in biodiversity conservation (Geijzendorffer et al. 2016). Hence, this study was conducted to identify nest structure and habitat characteristics and to provide the basic data for the protection of the threatened Pleske's Grasshopper Warblers.

MATERIALS AND METHODS

Study area

Chujado Island (33°56'94.7" N & 126°20'41.0" E) belongs to Jeju City, Jeju Special Self-Governing Province, South Korea (You et al. 2010). Near Chujado Island, there are 38 uninhabited islets, including Cheongdo, Jikgudo, and Heukgeomdo Islets. Among them, we selected the Cheongdo, Jikgudo, and Heukgeomdo Islets as study sites, and they can be accessed through ships (Figure 1). In the Cheongdo Islet, 62% of the total area (240,860.1 m²) covered with vegetation is located on the central part of the islet, and 38% of the total area is covered by rocky land with exposed rocks. The covered area of Jikgudo Islet (240,318.4 m²) is 62.7% of the total area, and the rocky land with exposed rocks occupies 37.3% of the total area (Korea National Park Service 2019). Of the total area (244,266.3 m²) of the Heukgeomdo Islet, 72% of the area is covered with vegetation and is located on the central part of the islet, and 28% of the area is covered by rocky land. The climatic conditions of Chujado Island are characteristic of the southern west coast type of the Korean climatic zone, with an average annual temperature of 13.8° C and annual precipitation of 1,391 mm.

On-site investigations

We performed on-site investigations from April 2019 to April 2021 in the uninhabited Cheongdo, Jikgudo, and Heukgeomdo Islets. A line census method was used with binoculars (Swarovski, 10 × 42 BA, Austria) for individual investigation. Two people were grouped to identify the species and population. We visited the breeding sites during the breeding season (early May to end of August) to mark the nesting areas using a GPS MAP 64s (Garmin International, Kansas, USA).

Nest environment

Breeding nests were identified using binoculars (Swarovski, 10 × 42 BA, Austria) and a field scope (Swarovski, 20 × 60), and photographs were taken using a camera (Canon EF 500 mm, Canon, Japan). An unmanned sensor camera (Bushwhacker, ROBOT D30, Shenzhen, China) was used to continuously photograph the nest when Pleske's Grasshopper Warblers started building the nests (Image 1). The unmanned sensor camera was installed more than 10 m from the breeding nest to prevent it from interfering with breeding. To measure nesting tree height, and nest diameter, we used a digital distance meter (Digital Range Finder; Leica DISTOTM X10; Mitutoyo, unit 0.05 mm)

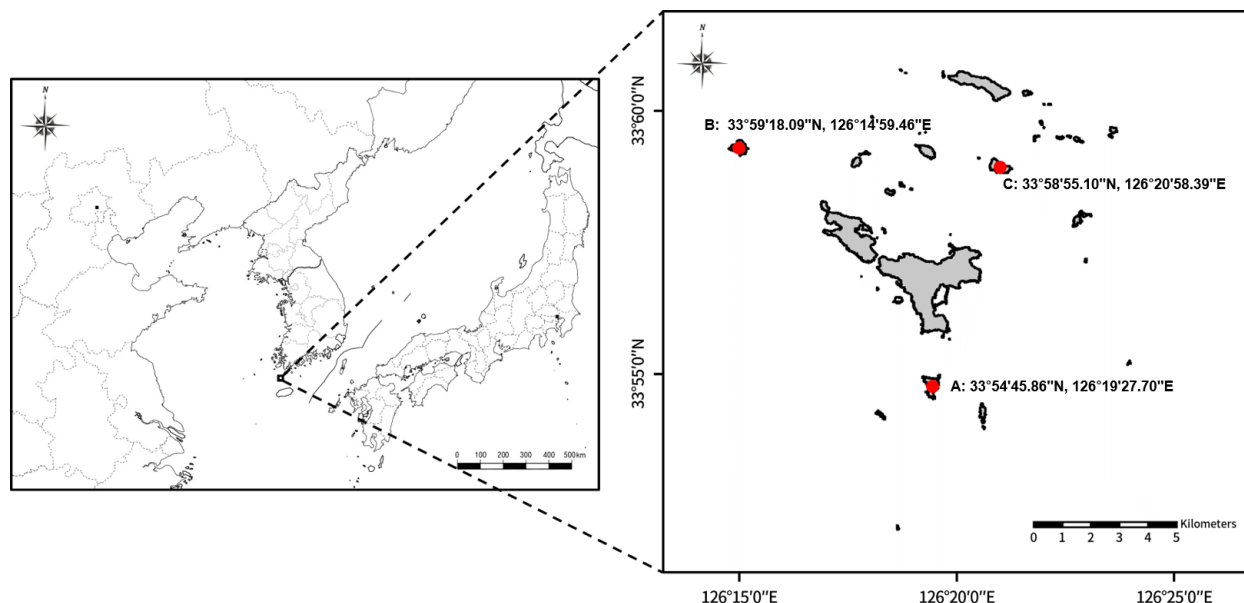


Figure 1. Distribution of the Pleske's Grasshopper Warbler breeding sites on unmanned islets (Cheongdo, Jikgudo, and Heukgeomdo) around Chuja Island, South Korea: A— Cheongdo I B—Jukgudo I C—Heukgeomdo.

Vegetation Colony

We investigated the vegetation status (colony structure) by selecting vegetation points such as trees, sub-trees, shrubs, and herbaceous layers. Furthermore, we investigated the vegetation dominance rate using the Braun-Blanquet cover-abundance scale (Wikum & Shanholtzer 1978).

RESULTS

Habitat status

The nesting sites of the Pleske's Grasshopper Warblers were identified in three islets: Cheongdo, Jikgudo, and Heukgeomdo. On Cheongdo Islet, nests were located as follows: four in *C. japonica*, one in *P. thunbergii*, and one in *Eurya emarginata*. On Jikgudo Islet, four nests were distributed with two in *C. japonica*, one in *P. thunbergii*, and one in *E. macrophylla*. Meanwhile, on Heukgeomdo islet, three nests were located, all in *C. japonica*. A total of 14, 10, and 12 individuals were found in Cheongdo, Jikgudo and Heukgeomdo Islets, respectively. The Pleske's Grasshopper Warblers in the study area started breeding in early May and began vocalizing to secure territory, and individuals incubated until the end of July. The areas of vegetation of Cheongdo Islet were 45% grassland, 16.9% forest land, and 0.1% shrubland (Figure 2). The main colonies that made up the forestland were *P. thunbergii* (8.1%) followed by *E. emarginata* (7.3%). *C. japonica* formed small colonies. *P. thunbergii* is widely

distributed on the southeastern slope and *C. japonica* is mainly distributed on the northern slope (Korea National Park Service 2019). The areas of vegetation of Jikgudo Islet were 25.1% grassland, 31.0% forestland, and 6.6% shrubland. The main colonies that made up the forestland were *E. emarginata* (12.8%) followed by *C. japonica* (11.1%). *P. thunbergii* formed small colonies. *E. emarginata* was distributed from the northern slope to the eastern slope, and *C. japonica* formed on the central and southwestern slopes of this islet. The areas of vegetation of Heukgeomdo Islet were 34.3% forestland, 33.6% grassland, and 6.6% shrubland. The main colonies that made up the forestland were *P. thunbergii* (17.1%) and *C. japonica* (16.4%). *Celtis sinensis* and *Rhus javanica* formed small colonies.

Nesting environment

The 13 Pleske's Grasshopper Warbler nests observed in this study, were nested in *P. thunbergii* and *C. japonica*. The warblers built nests inside coniferous trees, whereas they built nests in relatively large leaves in lush, broad-leaved evergreen trees.

In Cheongdo Islet, the nest height, nesting tree height and nest cup diameter were 1.69 ± 0.13 m (range: 1.48–1.85 m), 3.73 ± 1.21 m (range: 2.89–4.12 m) and 10.01 ± 0.32 cm (range 9.71–10.45 cm), respectively (Table 2). In Jikgudo Islet, the nest height, nesting tree height and nest cup diameter were 1.41 ± 0.07 m (range: 1.33–1.51 m), 3.01 ± 0.13 m (range: 2.85–3.13 m) and 9.83 ± 0.33 (range: 9.58–10.33), respectively. In Heukgeomdo

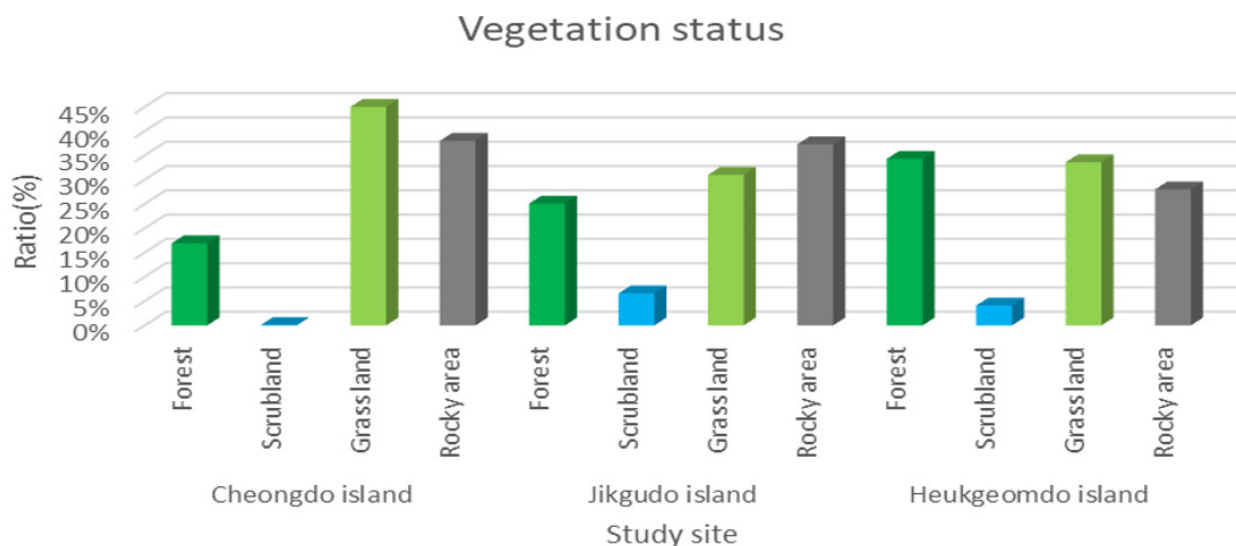
Table 1. Nest tree preference and the number of Pleske's Grasshopper Warblers on the South Korean study sites.

Study site	No. of individuals	No. of trees used for nesting and breeding			
		<i>Pinus thunbergii</i>	<i>Eurya emarginata</i>	<i>Camellia japonica</i>	<i>Elaeagnus macrophylla</i>
Cheongdo	14	1	1	4	
Jikgudo	10			2	1
Heukgeomdo	12			3	

Table 2. Dimensions of the nest height, nesting tree height, and nest cup diameter of the South Korean breeding sites of Pleske's Grasshopper Warblers.

Nest location Division	Cheongdo		Jikgudo		Heukgeomdo	
	Value	Range	Value	Range	Value	Range
Nest height (m*)	1.69 ± 0.13	1.48–1.85	1.41 ± 0.07	1.33–1.51	1.34 ± 0.18	1.19–1.63
Nesting tree height (m*)	3.73 ± 1.21	2.89–4.12	3.01 ± 0.13	2.85–3.13	3.10 ± 0.28	2.77–3.53
Nest cup diameter (cm*)	10.01 ± 0.32	9.71–10.45	9.83 ± 0.33	9.58–10.33	9.3 ± 0.44	8.56–9.69

*— Standard deviation

**Figure 2.** The ratio of the vegetation in the uninhabited islands of the Chuja Marine Provincial Park: Chengdo, Jikgudo, and Heukgeomdo islets.

Islet, the nest height, nesting tree height and nest cup diameter were 1.34 ± 0.18 m (range: 1.19–1.63 m), 3.10 ± 0.28 m (range: 2.77–3.53 m) and 9.3 ± 0.44 cm (range: 8.56–9.69 cm), respectively.

DISCUSSION

In response to predation and microclimate, birds select nesting locations to increase breeding rates and maximize the survival rates of their young (Gómez-

Serrano & López-López 2017). Vegetation is crucial for maintaining a thermal environment by controlling the micro-weather conditions, thereby reducing the effects of wind and direct sunlight, while simultaneously hiding the nest to reduce the probability of predation (Kim et al. 2009; Kearns & Rodewald 2013). Particularly, microclimate has a significant impact on the energy efficiency of eggs, young and gonads; therefore, the location, entrance direction and height of nests are adjusted to select microhabitats that are effective for maintaining body temperature and are protected from



Image 1. Current status of Pleske's Grasshopper Warblers on the study sites: A—song indicating territorial defence | B—nest defence | C, D—nest of Pleske's Grasshopper Warbler on *Eurya emarginata* tree. © Young Hoon Jeong

extreme weather factors (Polak 2019). Therefore, it is believed that nesting inside the islet and choosing trees with large and wide leaves, such as that in *C. japonica*, was caused by a defence mechanism to protect young from predatory pressure and to reduce nest exposure from birds of prey, such as the Peregrine Falcon, and by reducing the effects of sea breezes to maintain warmth (Montgomerie & Weatherhead 1988).

Comparing the habitat environments of Pleske's Grasshopper Warbler nests identified so far in Korea and Japan, Nagata (1993) and Park & Seo (2008) observed nests among lush herbs, and Kim et al. (2009) confirmed that nests were built in bushes. Choi et al. (2017) identified potential brooding sites on the steeply sloped areas on the island. In Japan, the Pleske's Grasshopper Warblers arrived between late April and June and began breeding (Takaki et al. 2001), and the warblers in the unmanned island breeding sites in the central and southern regions of South Korea began breeding in May and June (NIBR 2017). In our study area, the Pleske's

Grasshopper Warblers arrived in mid-May and began breeding from the end of June through August. These results tend to coincide with the breeding period and ecology of its living in the Japanese archipelago.

To date, the area of distribution of this species is limited to Russia, China, the Korean Peninsula, and Japan. As the latitude rises, breeding records become very rare (BirdLife International 2023). Therefore, except for the migration period, it is believed that this species will move south from Russia and breed in island areas near the Korean Peninsula and Japan. We found that the nest was built in subtrees such as *C. japonica*, *P. thunbergii*, and *E. emarginata*, which was similar to the results of Kim et al. (2009). As a result, Pleske's Grasshopper Warblers can be said to prefer shrubbery as a breeding nest.

Much still needs to be studied about the distribution, abundance, and habitat requirements of this species. Its threatened status and conservation requirements can be clarified by research targeted at the following areas:

(1) monitoring surveys to locate additional populations on islands within the potential breeding range in South Korea; (2) ecological studies at selected breeding sites to determine population and habitat requirements during the breeding season; (3) population studies comparing to past to determine whether there have been changes in the numbers and distribution since the original records; and (4) Capture-recapture surveys to locate populations in potential sites.

REFERENCES

- BirdLife International (2001).** *Threatened Birds of Asia: the BirdLife International Red Data Book*. Cambridge, UK, 2304 pp.
- BirdLife International (2023).** Species factsheet: *Helopsaltes pleskei*. In: BirdLife International 2023 IUCN Red List for birds. Download on 19 August 2009. <http://datazone.birdlife.org>
- Brazil, M. (2009).** *Birds of East Asia. China, Taiwan, Korea, Japan, Eastern Russia*. Christopher Helm., London, 528 pp.
- Choi, W.S., Y.W. Kim, J.C. Park, Y.S. Han & B.G. Chang (2017).** The characteristics of the uninhabited island, the habitat for Styan's Grasshopper Warbler, *Locustella Pleskei*. *The Journal of Korean Island* 29(1): 253–268.
- Fujita, K., G. Fujita, T. Tomioka, Y. Yamamoto & H. Higuchi (2005).** Estimated population sizes of Owston's Varied Tits and Taczanowski's Grasshopper Warblers, before and after the volcanic eruption of Miyake Island, the Izu Islands, Japan. *Strix* 23: 105–114.
- Geijendorffer, I.R., E.C. Regan, H.M. Pereira, L. Brotons, N. Brummitt, Y. Gavish, P. Haase, C.S. Martin, J.B. Minhoub, C. Secades, D.S. Schmeller, S. Stoll, F.T. Wetzel & M. Walters (2016).** Bridging the gap between biodiversity data and policy reporting needs: an essential biodiversity variables perspective. *Journal of Applied Ecology* 53(5): 1341–1350. <https://doi.org/10.1111/1365-2664.12417>
- Gómez-Serrano, M.Á. & P. López-López (2017).** Deceiving predators: linking distraction behavior with nest survival in a ground-nesting bird. *Behavioral Ecology* (28)1: 260–269. <https://doi.org/10.1093/beheco/arw157>
- Kearns, L.J. & A.D. Rodewald (2013).** Within-season use of public and private information on predation risk in nest-site selection. *Journal of Ornithology* 154(1): 163–172. <https://doi.org/10.1007/s10336-012-0882-7>
- Kim, E.M., H.J. Kim, C.Y. Choi, C.W. Kang, H.M. Kang & C.R. Park (2009).** Breeding site characteristics of Styan's Grasshopper Warblers (*Locustella pleskei*) on Mara Islet, Jeju Province, Korea. *Korean Journal of Environment and Ecology* 23(6): 528–534.
- Korea National Park Service (2019).** *Chuja Marine Provincial Park Natural Resources Survey in Jeju island*. Gangwon-do Province: Korea National Park Service, 305 pp. [in Korean]
- Lee, W.S., T.H. Ko & J.K. Park (2020).** *A Field Guide to the Birds of Korea. 2nd Edition*. Seoul: LG evergreen foundation, 403 pp. [in Korean].
- Nagata, H. (1993).** The structure of a local population and dispersal pattern in the Styan's Grasshopper Warbler, *Locustella pleskei*. *Ecological Research* 8: 1–9. <https://doi.org/10.1007/BF02348601>
- National Institute of Biological Resources (NIBR) (2017).** Endangered wildlife at a glance. NIBR, Incheon, 326–327 pp.
- National Institute of Biological Resources (NIBR) (2019).** Red data book of endangered birds in Korea. Incheon: National Institute of Biological Resources, 272 pp. [in Korean].
- Montgomerie, R.D. & P.J. Weatherhead (1988).** Risks and rewards of nest defence by parent birds. *The Quarterly Review of Biology* 63(2): 167–187.
- Park, J.G. & J.H. Seo (2008).** *A Photographic Guide to the Birds of Korea*. Shingu Media & Publishing, Seoul, 334 pp.
- Polak, M. (2019).** Nest concealment and nest defence by two passerines: effect of protective nesting association. *Zoological Studies* 58: e15. <http://doi.org/10.6620/ZS.2019.58-15>
- Qiao, Y.L., Y. Liu, D.S. Guo, X.Q. Zeng & E. Zhang (2006).** First Chinese breeding record of Pleske's Warbler *Locustella pleskei*, from a small island off Qingdao, Shandong province. *BirdingASIA* 6: 81–82.
- Takaki, Y., K. Eguchi & H. Nagata (2001).** The growth bars on tail feathers in the male Styan's Grasshopper Warbler may indicate quality. *Journal of Avian Biology* 32(4): 319–325. <https://doi.org/10.1111/j.0908-8857.2001.320405.x>
- Wikum, D.A. & G.F. Shanholtzer (1978).** Application of the Braun-Blanquet cover-abundance scale for vegetation analysis in land development studies. *Environmental Management* 2(4): 323–329.



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 W. 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. Chandrashekhar 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

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

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, SACON, 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, SACON, 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, SACON, 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 2018–2020 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 ~~Vadadara~~**Vadara**julu Nagar, 5th Street West, Ganapathy, Coimbatore,
Tamil Nadu 641006, India
ravi@threatenedtaxa.org



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)

August 2023 | Vol. 15 | No. 8 | Pages: 23631–23826

Date of Publication: 26 August 2023 (Online & Print)

DOI: 10.11609/jott.2023.15.8.23631-23836

www.threatenedtaxa.org

Articles

Group densities of endangered small apes (Hylobatidae) in two adjacent forest reserves in Merapoh, Pahang, Malaysia

– Adilah Suhailin Kamaruzaman, Nurul Iza Adrina Mohd Rameli, Susan Lappan, Thad Quincy Bartlett, Nik Rosely Nik Fadzly, Mohd Sah Shahrul Anuar & Nadine Ruppert, Pp. 23631–23640

Population demography of the Blackbuck *Antelope cervicapra* (Cetartiodactyla: Bovidae) at Point Calimere Wildlife Sanctuary, India

– Subhasish Arandhara, Selvaraj Sathishkumar, Sourav Gupta & Nagarajan Baskaran, Pp. 23641–23652

Communications

Camera trap surveys reveal a wildlife haven: mammal communities in a tropical forest adjacent to a coal mining landscape in India

– Nimain Charan Palei, Bhakta Padarbinda Rath, Himanshu Shekhar Palei & Arun Kumar Mishra, Pp. 23653–23661

Observations of Gray Fox *Urocyon cinereoargenteus* (Schreber, 1775) (Mammalia: Carnivora: Canidae) denning behavior in New Hampshire, USA

– Maximilian L. Allen & Jacob P. Kritzer, Pp. 23662–23668

Historical and contemporary perpetuation of assumed occurrence reports of two species of bats in Rajasthan, India

– Dharmendra Khandal, Ishan Dhar & Shyamkant S. Talmale, Pp. 23669–23674

Preference of *Helopsaltes pleskei* (Taczanowski, 1890) (Aves: Passeriformes: Locustellidae) on uninhabited islets (Chengdo, Jikgudo, and Heukgeomdo) in South Korea as breeding sites

– Young-Hun Jeong, Sung-Hwan Choi, Seon-Mi Park, Jun-Won Lee & Hong-Shik Oh, Pp. 23675–23680

Avifaunal diversity of Tsirang District with a new country record for Bhutan

– Gyeltshen, Sangay Chhophel, Karma Wangda, Kinley, Tshering Penjor & Karma Dorji, Pp. 23681–23695

Importance of conserving a critical wintering ground for shorebirds in the Valinokkam Lagoon—a first study of the avifaunal distribution of the southeastern coast of India

– H. Byju, N. Raveendran, S. Ravichandran & R. Kishore, Pp. 23696–23709

Diversity and conservation status of avifauna in the Surguja region, Chhattisgarh, India

– A.M.K. Bharos, Anurag Vishwakarma, Akhilesh Bharos & Ravi Naidu, Pp. 23710–23728

Seasonal variation and habitat role in distribution and activity patterns of Red-wattled Lapwing *Vanellus indicus* (Boddaert, 1783) (Aves: Charadriiformes: Charadriidae) in Udaipur, Rajasthan, India

– Sahil Gupta & Kanan Saxena, Pp. 23729–23741

Notes on nesting behavior of Yellow-footed Green Pigeon *Treron phoenicopterus* (Latham, 1790) in Aligarh Muslim University campus and its surroundings, Uttar Pradesh, India

– Ayesha Mohammad Maslehuddin & Satish Kumar, Pp. 23742–23749

Observations on cooperative fishing, use of bait for hunting, propensity for marigold flowers and sentient behaviour in Mugger Crocodiles *Crocodylus palustris* (Lesson, 1831) of river Savitri at Mahad, Maharashtra, India
– Utkarsha M. Chavan & Manoj R. Borkar, Pp. 23750–23762

Communal egg-laying by the Frontier Bow-fingered Gecko *Altiphylax stoliczkai* (Steindachner, 1867) in Ladakh, India

– Dimpri A. Patel, Chinnasamy Ramesh, Sunetro Ghosal & Pankaj Raina, Pp. 23763–23770

Description of a new species of the genus *Anthaxia* (Haplantaxia Reitter, 1911) from India with molecular barcoding and phylogenetic analysis

– S. Seena, P.P. Anand & Y. Shibu Vardhanan, Pp. 23771–23777

Odonata diversity in the Egra and its adjoining blocks of Purba Medinipur District, West Bengal, India

– Tarak Samanta, Asim Giri, Lina Chatterjee & Arjan Basu Roy, Pp. 23778–23785

Morpho-anatomy and habitat characteristics of *Xanthostemon verdugonianus* Naves ex Fern.-Vill. (Myrtaceae), a threatened and endemic species in the Philippines

– Jess H. Jumawan, Arlyn Jane M. Sinogbuhan, Angie A. Abucayon & Princess Ansie T. Taperla, Pp. 23786–23798

The epiphytic pteridophyte flora of Cooch Behar District of West Bengal, India, and its ethnomedicinal value

– Aninda Mandal, Pp. 23799–23804

Seed germination and storage conditions of *Ilex embelioides* Hook.f. (Magnoliopsida: Aquifoliales: Aquifoliaceae), a threatened northeastern Indian species

– Leoris Malngiang, Krishna Upadhaya & Hiranjit Choudhury, Pp. 23805–23811

Short Communications

Mantispa indica Westwood, 1852 (Neuroptera: Mantispidae), a rare species with some morphological notes from Assam, India

– Kushal Choudhury, Pp. 23812–23816

Notes

Auto-fellatio behaviour observed in the Indian Palm Squirrel *Funambulus palmarum* (Linnaeus, 1766)

– Anbazhagan Abinash, C.S. Vishnu & Chinnasamy Ramesh, Pp. 23817–23818

A novel anti-predatory mechanism in *Indrella ampulla* (Gastropoda: Ariophantidae)

– Karunakar Majhi, Maitreya Sil & Aniruddha Datta-Roy, Pp. 23819–23821

Hedychium coccineum Buch.-Ham. ex Sm. (Zingiberaceae): an addition to the flora of Andhra Pradesh, India

– P. Janaki Rao, J. Prakasa Rao & S.B. Padal, Pp. 23822–23826

Publisher & Host

