

Building evidence for conservation globally

# Journal of Threatened Taxa

10.11609/jott.2025.17.3.26571-26762

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

26 March 2025 (Online & Print)

17(3): 26571-26762

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

Srivari Illam, No. 61, Karthik Nagar, 10th Street, Saravanampatti, Coimbatore, Tamil Nadu 641035, India  
Registered Office: 3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore, Tamil Nadu 641006, India  
Ph: +91 9385339863 | [www.threatenedtaxa.org](http://www.threatenedtaxa.org)  
Email: [sanjay@threatenedtaxa.org](mailto:sanjay@threatenedtaxa.org)

#### EDITORS

##### Founder & Chief Editor

**Dr. Sanjay Molur**

Wildlife Information Liaison Development (WILD) Society & Zoo Outreach Organization (ZOO),  
Coimbatore, Tamil Nadu 641006, India

##### Assistant Editor

**Dr. Chaithra Shree J.**, WILD/ZOO, Coimbatore, Tamil Nadu 641006, 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

##### Board of Editors

**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. 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

##### Copy Editors

**Ms. Usha Madgunaki**, Zooreach, Coimbatore, India

**Ms. Trisa Bhattacharjee**, Zooreach, Coimbatore, India

**Ms. Paloma Noronha**, Daman & Diu, India

##### Web Development

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

##### Typesetting

**Mrs. Radhika**, Zooreach, Coimbatore, India

**Mrs. Geetha**, Zooreach, Coimbatore, India

#### Fundraising/Communications

**Mrs. Payal B. Molur**, Coimbatore, India

#### Subject Editors 2021–2023

##### 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](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](https://threatenedtaxa.org/index.php/JoTT/policies_various)

continued on the back inside cover

Cover: A bag worm with its beautiful heap of junk. Acrylics on 300 GSM paper by Dupati Poojitha based on a picture by Sanjay Molur.





## *Dasymaschalon leilamericanum* (Annonaceae), a new species with evidence of non-monophyly from Mount Lantoy Key Biodiversity Area, Philippines

Raamah Rosales<sup>1</sup> , Edgardo Lillo<sup>2</sup> , Archiebald Baltazar Malaki<sup>3</sup> , Steve Michael Alcazar<sup>4</sup> ,  
Bernardo Redoblado<sup>5</sup> , John Lou Diaz<sup>6</sup> , Inocencio Buot Jr.<sup>7</sup> , Richard Parilla<sup>8</sup> & Jessica Rey<sup>9</sup>

<sup>1</sup>College of Arts and Sciences, Cebu Technological University-Main Campus, Cebu City, Philippines.

<sup>2,3,4,5,6</sup> Cebu Technological University-Argao Campus, Cebu, Philippines.

<sup>7</sup>Forest Biological Sciences, College of Forestry and Natural Resources, University of the Philippines, Los Baños, Laguna, Philippines.

<sup>8</sup>Division of Natural Science and Mathematics, University of the Philippines - Tacloban College, Leyte, Philippines.

<sup>9</sup>Institute of Biological Science, College of Arts and Sciences, University of the Philippines, Los Baños, Laguna, Philippines.

<sup>1</sup>raamah.rosales@ctu.edu.ph (corresponding author), <sup>2</sup>edgardo.lillo@ctu.edu.ph, <sup>3</sup>archlam68@gmail.com, <sup>4</sup>alcazarstevemichael@gmail.com,

<sup>5</sup>bnad7@gmail.com, <sup>6</sup>diazjohnlou@gmail.com, <sup>7</sup>iebuot@up.edu.ph, <sup>8</sup>rbparilla@up.edu.ph, <sup>9</sup>jdrey@up.edu.ph

**Abstract:** A new Annonaceae species, *Dasymaschalon leilamericanum* is described from Mount Lantoy Key Biodiversity Area (KBA) in the Municipality of Argao, Cebu, Philippines. *D. leilamericanum* is distinguished from closely related species by morphological characters including laminar size, leaf areolation, and seed/fruit shape and size. Significant differences observed in a multivariate analysis of morphological data for *D. leilamericanum*, *D. clusiflorum*, *D. filipes*, *D. ellipticum*, and *D. blumei* indicate *D. leilamericanum* is a distinct species. A phylogenetic tree analysis performed using maturase K (*matK*) and ribulose 1,5-biphosphate carboxylase (*rbcl*) as molecular markers failed to match *D. leilamericanum* with other *Dasymaschalon* species. Taken together, the results of morphological and molecular analysis indicate a unique evolutionary pathway for *D. leilamericanum* with its genus.

**Keywords:** Conservation, Cebu Island, evolutionary, forest, limestone, multivariate, non-monophy, plant, paraphyletic, phylogenetic, sedimentary, shrub.

**Cebuano:** Espesye sa bag-ong Annonaceae ang *Dasymaschalon leilamericanum* nga gihulagway sa Mount Lantoy Key Biodiversity Area (KBA) sa Munisipyo sa Argao, Cebu, Pilipinas. Ang *D. leilamericanum* gipalahi gikan sa suod nga relasyon nga mga espisye pinaagi sa morphological nga mga karakter lakip ang laminar size, dahon areolation, ug liso/bunga porma ug gidak-on. Mahinungdanon nga mga kalainan nga nakita sa usa ka multivariate nga pagtuki sa morphological data alang sa *D. leilamericanum*, *D. clusiflorum*, *D. filipes*, *D. ellipticum*, ug *D. blumei* nagpakita nga ang *D. leilamericanum* usa ka lahi nga espisye. Usa ka phylogenetic tree analysis nga gihimo gamit ang maturase K (*matK*) ug ribulose 1,5-biphosphate carboxylase (*rbcl*) kay ang mga molecular marker napakyas sa pagpares sa *D. leilamericanum* sa ubang klase sa *Dasymaschalon*. Sa tingub, ang mga resulta sa morphological ug molecular analysis nagpakita sa usa ka talagsaon nga evolutionary pathway alang sa *D. leilamericanum* uban sa iyang genus.

**Editor:** Mandar Paingankar, Government Science College Gadchiroli, Maharashtra, India.

**Date of publication:** 26 March 2025 (online & print)

**Citation:** Rosales, R., E. Lillo, A.B. Malaki, S.M. Alcazar, B. Redoblado, J.L. Diaz, I. Buot Jr., R. Parilla & J. Rey (2025). *Dasymaschalon leilamericanum* (Annonaceae), a new species with evidence of non-monophyly from Mount Lantoy Key Biodiversity Area, Philippines. *Journal of Threatened Taxa* 17(3): 26571–26586. <https://doi.org/10.11609/jott.8364.17.3.26571-26586>

**Copyright:** © Rosales et al. 2025. 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:** Department of Science and Technology – Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD); Cebu Technological University (CTU)

**Competing interests:** The authors declare no competing interests.

**Author details & Author contributions:** See end of this article.

**Acknowledgements:** The authors would like to acknowledge the Department of Science and Technology (DOST) for considering and approving our research proposal and giving us the budget for three years, enough for the implementation of the whole study, and declaring CTU as one of the DOST–Biodiversity Centers through the NICER program in Region 7. The Philippine Council for Agriculture and Aquatic Resources Research Development (PCAARRD) favorably recommended our proposal to DOST and guided us in the implementation of the study, assisted us in the report preparation, and writing. The National Research Council of the Philippines (NRCP) of DOST provided expert assistance through its RD LEAD program. The CTU System supported the research team all the way. The Bachelor of Science in Forestry (BSF 1) students who assist in the collection of voucher specimens. Cherelyn Davirao, Renante Getaruelas, and Beatrice Nicole Cagara and BSF 2 students who help in the characterization of species. The molecular laboratory staff of UP Diliman-Institute of Biology, Charles Anthon Cardona, for helping in the DNA extraction and PCR Analysis of the plant samples. The Philippine Genome Center-Mindanao for its assistance in the phylogenetic analysis.



## INTRODUCTION

The forest of Cebu island in the Philippines, is home to several endemic species of flora and fauna (Cadiz & Buot 2010; Rosales et al. 2020). Several of the endemic species growing in this area are threatened due to deforestation and continued human pressure (Lillo et al. 2019, 2020, 2021). The forest fragments of Mount Lantoy Key Biodiversity Area (KBA) in Argao, Cebu, listed two Critically Endangered, two Endangered, four Vulnerable, and 16 restricted-range species (CI/DENR-PAWB/Haribon 2006). The Tabunan forest of the Central Cebu Protected Landscape (CCPL) is the largest forest fragment with an area of 40 ha. The Tabunan forest is home to the endemic *Cinnamomum cebuense* Kosterm and among the threatened species in spite its distribution range is within the protected landscape (Quimio 2006).

The genus *Dasymaschalon* is classified under the order Magnoliales of the family Annonaceae. It was initially considered to be a part of section *Unona* auct. non L. (Hooker & Thomson 1855). *Dasymaschalon* was classified as a section of *Desmos* Loureiro's (1790:352) *Desmos* sect by Hooker & Thomson (1855:134) and Safford (1912:507) Saff, *Dasymaschalon* (1912:507) (e.g. Sinclair 1955; Maxwell 1989; Li 1993). Many taxonomists such as Finet & Gagnepain (1906), Merrill (1915), Hutchinson (1923), Fries (1959), Bân (1975), Klucking (1986), Van Heusden (1992), Kebler (1993), Koek-Noorman et al. (1997), Sun et al. (2002) disagreed with the taxonomic treatment of Safford and supported Dalla Torre & Harms' decision to raise *Dasymaschalon* to the generic rank in 1901.

The genus *Dasymaschalon* is primarily found in southeastern Asia (Craib 1912; Merrill 1915; Sinclair 1955; Ast 1938; Tsiang & Li 1979; Bân 2000; Nurmawati 2003; Wang et al. 2009, 2012) particularly in southern China, Philippines, Indonesia, Malaysia, Thailand, and Indochina. Dalla-Torre & Harms (1901) estimated that *Dasymaschalon* (Hook & Thomson 1885) may have up to 30 species (Wang et al. 2009, 2012), with three (<http://www.philippineplants.org/Families/Annonaceae.html>) found in the Philippines and one in India. According to Guo et al. (2018), the genus *Dasymaschalon* is closely related to *Friesodielsia* Steenis s.str. (1948:458) and is morphologically distinct with small trees and shrubs (rarely climbers), shallow conical torus, 2–3-cohering petals arranged in one whorl, echinate ornamentation and pollen with thin exine (Walker 1971; Le Thomas 1980, 1981; Van Heusden 1992; Kebler 1993; Doyle & Le Thomas 2012).

While undertaking a field survey of flora on Mount Lantoy KBA of the Municipality of Argao (Image 1), we came across an interesting species of *Dasymaschalon* which did not match other known species. In this paper, we describe a new species of *Dasymaschalon* from Mount Lantoy Key Biodiversity Area, Cebu Island, Philippines.

## MATERIALS AND METHODS

### Sampling site

The novel *Dasymaschalon* was collected during a field survey of flora on Mount Lantoy KBA of the Municipality of Argao (Image 1). Mount Lantoy is one of the new sites classified as a key biodiversity area (KBA) among the 117 terrestrial areas in the Philippines based on irreplaceability and vulnerability criteria (Mallari et al. 2001). These sites are inhabited by 16 restricted-range, four Vulnerable, two Endangered, and two Critically Endangered species (CI/DENR-PAWB/Haribon 2006).

### Plant morphological characterization

Photographic records were taken, and voucher specimens were collected and subsequently deposited in the DOST-NICER Biodiversity Museum and University of San Carlos (USC)-Terrestrial Species Museum. The description of morphological characters of the species is based on fruit and vegetative traits (LAWG 1999; Pi et al. 2009; Masungsong et al. 2019; Hernandez et al. 2020) (Ngoc-Daido et al. 2018). The vegetative traits were examined and measured from seedlings and press-dried specimens while field characteristics were noted on the spot. Fruit traits were noted in both fresh specimens and those preserved in 70% ethanol.

The third mature leaves, which are the ones that are fully exposed to sunlight, were chosen as the leaf samples for characterization (Pi et al. 2009). The specimen's ten mature leaf samples were employed in the investigation. With a hand lens with greater magnification, the leaf samples were inspected. Based on the Leaf Architectural Working Group Manual, the leaf architecture was described (LAWG 1999). Following Masungsong et al. (2019) and Hernandez et al. (2020), petiole length width and leaf blade were measured using a digital caliper, and venation angles, base and apex were determined using a protractor. Additionally, herbarium specimens were analyzed using online photos of the type specimens ([www.philippineplants.org](http://www.philippineplants.org)). Except where noted, every photo was taken outdoors where the species were located. The morphological analysis of variance was used

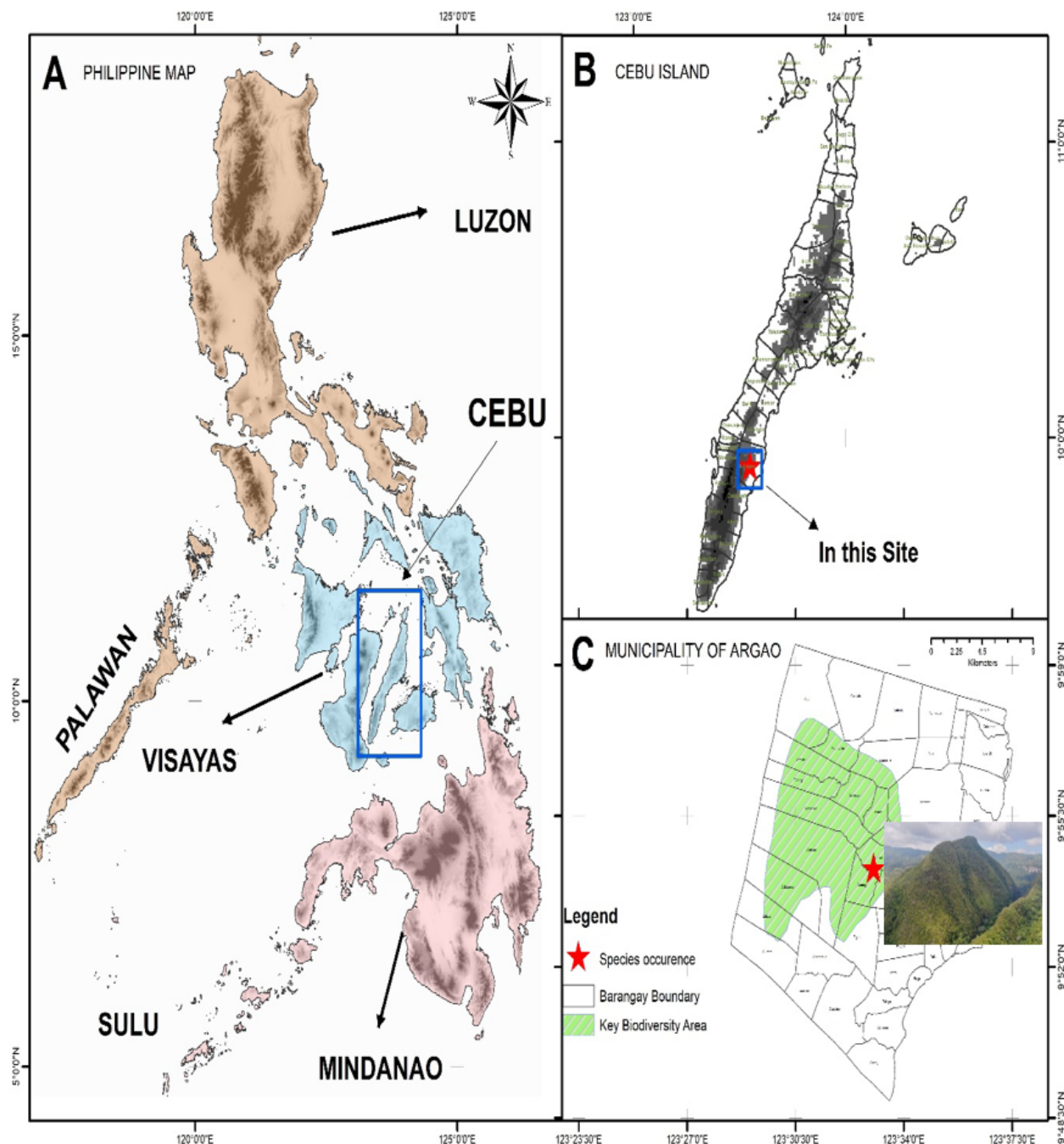


Image 1. Location of the new species in Mount Lantoy of the Municipality of Argao, Cebu at Philippine map (GIS generated map; Landsat 8; [www.earthexplorer.usgs.ph](http://www.earthexplorer.usgs.ph); NAMRIA; Philippine GIS data). A—Philippine map and location of Cebu Island within the box | B—Cebu Island and location of the study site within the box | C—specimen collection site indicated by the star mark.

for the morphological traits of the *D. leilamericanum* and the related species (Meeran et al. 2023)

#### DNA Extraction, amplification, and sequencing

Chloroplast genomic DNA was extracted from dried leaves of the specimens collected from the study site using the QIAGEN DNeasy® Plant Mini Kit while

sample cleanup was done using the QIAGEN DNeasy® PowerClean® Pro Cleanup Kit, following manufacturer's protocols, respectively. For amplification each 50 µl PCR contained 25 µl of MyTaq® HS Red Mix, 2x, 1 µl of each forward and reverse primer, 1 µl of DNA template, and 1 µl nuclease-free water (NFW). The respective thermal cycle conditions were 95°C denaturation, 50°C annealing,

70°C, and 72°C extension. A total of 12 samples were sent for sequencing at the facility of Macrogen, Inc., Seoul, South Korea.

For the molecular authentication of the new species, the most commonly preferred gene loci suggested by the Consortium for the Barcoding of Life (CBOL), maturase K (*matK*) and ribulose 1,5-biphosphate carboxylase (*rbcl*), were chosen as primers (Yu et al. 2011; Tran et al. 2021). These cpDNA were also used by Guo et al. (2018) in demonstrating the incongruence among different gene trees involving *Dasymaschalon* and other closely-related taxa. The forward and reverse primers used to amplify *matK* and *rbcl* genes were adopted from respective authors cited in de Vere et al. (2015). The primer sequence for the *matK*-forward (MatK-3FKIM-r) CGTACAGTACTTTTGTGTTTACGAG and *matK*-R (*matK*\_1R\_kim) ACCCAGTCCATCTGGAAATCTTGGTCC. The primer sequence for *rbcl*-forward (*rbcl*a-F) ATGTCACCACAAACAGAGACTAAAGC and *rbcl*-reverse (*rbcl*Lajf634R) GAAACGGTCTCTCCAACGCAT.

#### Alignment and Phylogenetic Analyses

The complementary chromatogram reads from sequenced samples were checked and trimmed for quality control using Finch TV, then aligned to generate a consensus sequence using BioEdit software (CAP contig assembly). The consensus sequence was then reverse complemented followed by alignment with closely related species in MEGA7 via MUSCLE (Edgar 2004). This is then followed by trimming of gaps between the sequences and deletion of sequences with common undefined base calls and sequences with relatively short alignment. There was also an addition of related plant species and/or replacement of different reference sequences in order to lengthen the generated alignment via MUSCLE. Using the same software, the Best Fit Model was determined via the Maximum Likelihood of the default setting (Model Selection ML – Automatic Neighbor-Joining Tree). The phylogenetic tree was then generated using the best model determined for the aligned sequences, and the test of phylogeny was set to bootstrap (1,000 replicates) and completion for gaps regardless of the method.

The sequences were submitted to nucleotide Basic Local Alignment Search Tools (BLAST) of the National Center for Biotechnology Information (NCBI) as well as to the Barcode of Life Database (BOLD) system for similarity checks and identification. Conversely, for further phylogenetic analyses and evolutionary tree construction, the *matK* and *rbcl* respective gene sequences of species belonging to all related genera

in the family Annonaceae with *D. leilamericanum* were retrieved and accessed from GenBank® of the National Center for Biotechnology Information (NCBI) (Table 1). The *matK* and *rbcl* DNA sequences were submitted to NCBI for the application of accession numbers.

## RESULTS AND DISCUSSION

The *D. leilamericanum* is described through morphological and molecular characterization. The morphological diagnostic characters used are plant habit, leaf pattern, apex of leaf, base, veins order and category, flower, petals, sepals, stamen, pedicels, fruits and monocarp, stalks, and seeds.

#### Morphological diagnostic characters

The analysis clearly showed that *D. leilamericanum* differs from other *Dasymaschalon* in having distinct morphological characteristics such as larger laminar size which belong to notophyll category (LAWG 1999) with leaf area ranging from 2,025–4500 mm<sup>2</sup>, laminar length: width ratio of 4:1, vein orders; Leaf 10 vein category pinnately veined, 20 vein category festooned semicraspedodromous veined, agrophic veins simple, 20 vein spacing irregular, 20 vein angle smoothly decreasing toward the base, inter 20 veins weak inter-secondaries, 30 vein category alternate percurrent, 30 vein coarse sinuous, 30 vein angle to 10 obtuse, 30 vein angle variability inconsistent, 40 and 50 vein category regular polygonal reticulate, and the leaf areolation 5 or more sides. Fruit stalk (infructescence) 29 mm, axillary/terminal, Pedicels (per Monocarp) ranges 13–38 mm, Monocarps 50–60 pcs, ellipsoid 9–20 x 8–13 mm, pinkish to black color, 5–7 seeded/monocarp, embedded in pulpy tissue. Seed dimension 0.7–0.9 cm x 0.5–0.6 cm (Table 2; Images 2, 3, 4, & 5).

#### Taxonomy

***Dasymaschalon leilamericanum* Rosales & Lillo, sp. nov.**  
(Images 2–6)

**Type:** Holotype: Lillo 00090 (CTU-DOST NICER Biodiversity Museum). Philippines, Cebu Island, Municipality of Argao, Mount Lantoy KBA (Lat. 9.904229, Long. 123.5513) at 99 m elevation (Image 1). The type specimen was located at the base of Mount Lantoy, along the river of Barangay Usmad, bearing multiple fruits, 2 March 2020.

Isotype: USCBM 2675 (University of San Carlos

**Table 1.** List of selected species used to reconstruct the phylogenetic tree for *Dasymaschalon leilamericanum* sp. nov. and their GenBank Accession information.

	Species	GenBank Accession	
		<i>rbcL</i>	<i>matK</i>
1	<i>Dasymaschalon leilamericanum</i> sp. nov.	[PQ878320]	[PQ869009]
2	<i>Dasymaschalon macrocalyx</i>	[AY841610.1]	[AB924891.1]
3	<i>Dasymaschalon clusiflorum</i>	[JQ768668.1]	[JQ768548.1]
4	<i>Dasymaschalon filipes</i>	[JQ768672.1]	[MH308078.1]
5	<i>Dasymaschalon ellipticum</i>	[JQ768670.1]	[JQ768550.1]
6	<i>Dasymaschalon oblongatum</i>	[JQ768679.1]	[JQ768559.1]
7	<i>Dasymaschalon megalanthum</i>	[JQ768678.1]	[JQ768558.1]
8	<i>Dasymaschalon longiflorum</i>	[JQ768675.1]	[MH308073.1]
9	<i>Dasymaschalon dasymaschalum</i>	[MT264015.1]	[MT264031.1]
10	<i>Dasymaschalon glaucum</i>	[JQ768673.1]	[JQ768553.1]
11	<i>Dasymaschalon acuminatum</i>	[MT264012.1]	[MT264028.1]
12	<i>Desmos dumosus</i>	[JQ768689.1]	[HG005013.1]
13	<i>Desmos chinensis</i>	[JQ762414.1]	[KP093298.1]
14	<i>Desmos polycarpus</i>	[KF496673.1]	[KX786589.1]
15	<i>Desmos elegans</i>	[HQ214067.1]	[JQ768571.1]
16	<i>Desmos cochinchinensis</i>	[JQ768688.1]	[OL604143.1]
17	<i>Friesodielsia desmoides</i>	[AY841618.1]	[JQ768577.1]
18	<i>Friesodielsia biglandulosa</i>	[MG896081.1]	[MG910438.1]
19	<i>Friesodielsia glauca</i>	[MG896051.1]	[MG910428.1]
20	<i>Schefferomitra subaequalis</i>	[KX786628.1]	[KX786606.1]
21	<i>Uvaria macrophylla</i>	[KP094324.1]	[KP093408.1]
22	<i>Uvaria concava</i>	[JN175197.1]	[JN175167.1]
23	<i>Uvaria cordata</i>	[JN175198.1]	[AB924906.1]
24	<i>Uvaria wrayi</i>	[FJ743821.1]	[AB924778.1]
25	<i>Uvaria siamensis</i>	[FJ743824.1]	[AB925067.1]
26	<i>Uvaria lucida</i>	[MN166687.1]	[MN166628.1]
27	<i>Melodorum fruticosum</i>	[AY319071.1]	[AB924724.1]
28	<i>Monanthotaxis micrantha</i>	[KX761331.1]	[KX761300.1]
29	<i>Monanthotaxis buehnanii</i>	[JQ768700.1]	[JX517585.1]
30	<i>Monanthotaxis fornicata</i>	[JQ768702.1]	[JQ768583.1]
31	<i>Monanthotaxis montana</i>	[MF353789.1]	[MF353672.1]
32	<i>Monanthotaxis whytei</i>	[AY841635.1]	[EF179278.1]
33	<i>Cyathostema viridiflorum</i>	[AY841607.1]	[FJ743746.1]
34	<i>Cleistochlamys kirkii</i>	[JX572412.1]	[JX517486.1]
35	<i>Dielsiothamnus divaricatus</i>	[EU169759.1]	[KX146236.1]
36	<i>Meiocarpidium lepidotum</i>	[EU169754.1]	[EU169687.1]
37	<i>Mitrella kentii</i>	[AY841633.1]	[FJ743751.1]
38	<i>Monocyclanthus vignei</i>	[EU169765.1]	[EU169698.1]
39	<i>Ophrypetalum odoratum</i>	[EU169767.1]	[EU169702.1]
40	<i>Pyramidanthe prismatica</i>	[JN175193.1]	[JN175163.1]
41	<i>Toussaintia orientalis</i>	[EU169756.1]	[EU169689.1]





Image 2. Habitat and habit of *Dasymaschalon leilamericanum* sp. nov.: a—panoramic view of Mount Lantoy KBA | b— Argao river at the base of Mount Lantoy | c—Leaf arrangement | d–f—Habit of *Dasymaschalon leilamericanum* sp. nov. © John Lou Diaz.

Biological Museum).

**Ecology:** Near a height of 99 m, the species is found in creeks with thick vegetation at the foot of Mount Lantoy (Image 1). The Carcar formation dominates the Mount Lantoy KBA, which is defined as a forest over limestone habitat type. Its geological makeup is dominated by elevated sedimentary and metamorphic rocks, with limestone making up a sizeable portion of that composition (Audley-Charles et al. 1979).

The species was found 5 m from the river bed. The species associated with *Dasymaschalon leilamericanum* Rosales and Lillo at the type locality include, among many others, *Rapanea philippinensis* (A. DC.) Mez (Primulaceae), *Ficus benjamina* L. (Moraceae), *Bischofia javanica* Blume (Phyllanthaceae), *Guioa koelreuteria*

(Blanco) Merr. (Sapindaceae), *Melicope triphylla* (Lam.) Merr. (Rutaceae), *Neonauclea calycina* (Bartl.) Merr. (Rubiaceae), *Senna alata* (Fabaceae), *Schefflera obtusifolia* Merr. (Araliaceae), *Guioa acuminata* Radlk. (Sapindaceae), *Goniiothalamus elmeri* Merr. (Annonaceae), *Semecarpus cuneiformis* Blanco (Anacardiaceae), *Vitex parviflora* Juss. (Lamiaceae), *Bridelia stipularis* Blume (Phyllanthaceae), and *Canarium asperum* Benth. (Burseraceae).

**Distribution:** Thus far, Mount Lantoy KBA in the Municipality of Argao, Cebu, is where this new species is known to exist (Image 1). *Dasymaschalon* species are widespread in forests and thickets at low and medium elevations, sometimes on limestone soil, according to Merrill (1923).



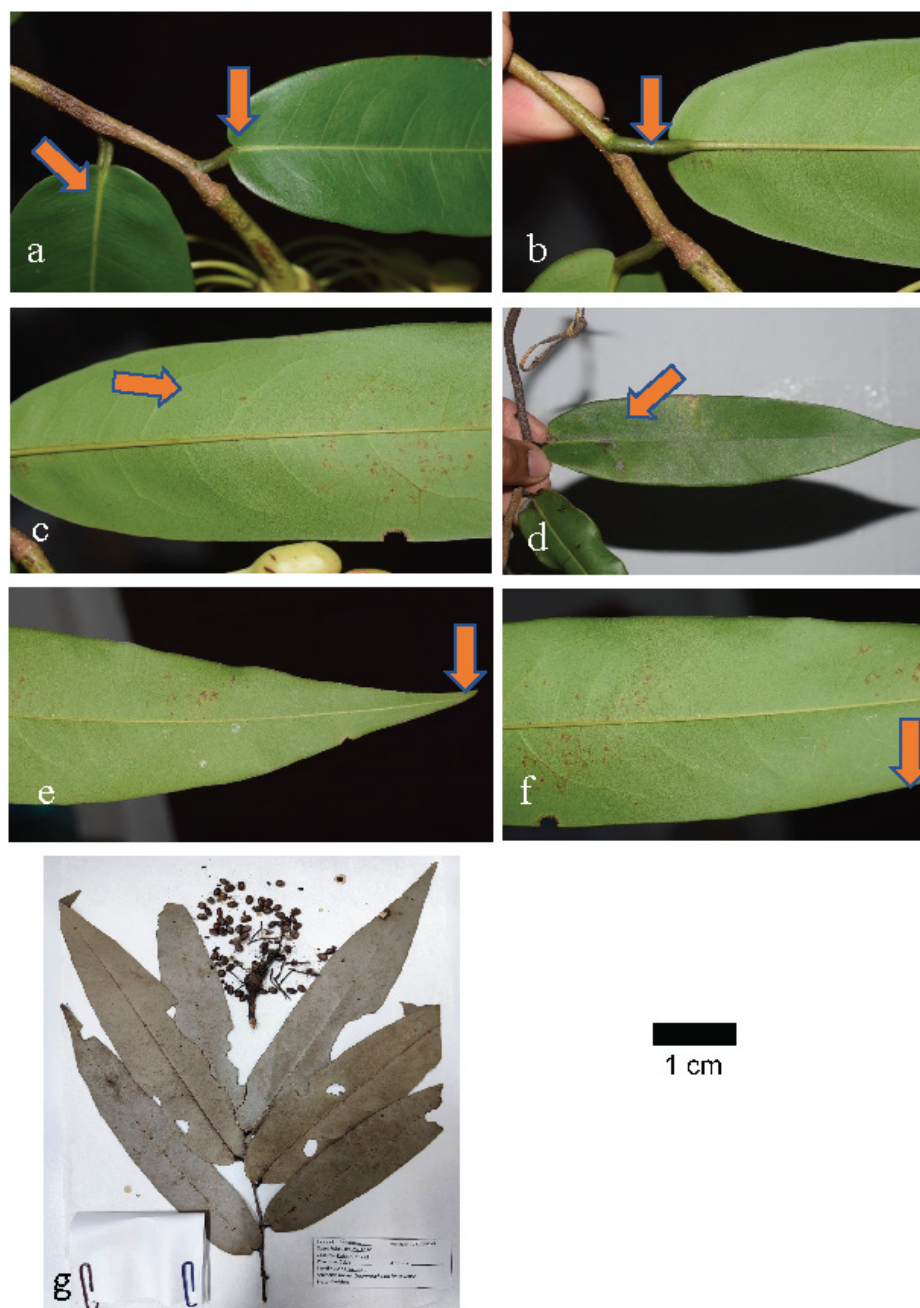


Image 3. Leaf morphology of *Dasymaschalon leilamericanum* sp. nov.: a—alternate leaf arrangement | b—swollen petiole | c—back surface (adaxial) | d—leaf surface (abaxial) | e&f—leaf apex (adaxial) | g—herbarium specimen. © John Lou Diaz.

**Etymology:** This new species is named in honor of Dr. Leila America who actively promoted biodiversity conservation in the Philippines. Dr. America was the former director of the Forestry and Environment Research Division (FERD), prior to her passing, of the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) under the Department of Science and Technology (DOST) of the Philippines.

This new species would add to the list of important species that serve as the basis for the protection and conservation of the mountain as a habitat for the endemic species of Cebu Island. Pelsér & Barcelona (2017) recorded the 'Critically Endangered' *Cynometra cebuensis* species in Mount Lantoy KBA. Other endemic species include *Copsychus cebuensis* Steere, 1890 (Malaki et al. 2018) and *Anixa zebuensis* Broderip, 1841 (Rosales et al. 2020).



Image 4. Fruiting habit of *Dasymaschalon leilamericanum* sp. nov. © John Lou Diaz.



Image 5. Fruits and Seeds of *Dasymaschalon leilamericanum* sp. nov. © John Lou Diaz.

**Table 2. Morphological comparison of *Dasymaschalon leilamericanum* sp. nov., *Dasymaschalon clusiflorum* (Merr.) Merr, *Dasymaschalon filipes* (Ridl.) Ban, *Dasymaschalon ellipticum* Nurmawati, and *Dasymaschalon blumei* (Finet & Gagnep 1906; Nurmawati 2003).**

Plant Morphology (LAWG 1999)	<i>Dasymaschalon leilamericanum</i> sp. nov.	<i>Dasymaschalon clusiflorum</i> (Merr.) Merr.	<i>Dasymaschalon filipes</i> (Ridl.) Ban	<i>Dasymaschalon ellipticum</i> Nurmawati	<i>Dasymaschalon blumei</i> Finet & Gagnep
Habit	Small tree 5 m in height.	Small tree up to 10 m high.	Small trees, 5 m high. Branches glabrous	Small trees up to 5 m. Branches glabrous	Branches are either tomentose or glabrous and either a shrub or a small tree with a height of 6 m.
Leaf pattern	Simple and alternate in arrangement, petiolar attachment marginal and swollen appearance, glabrous, lamina chartaceous to sub coriaceous, laminar size notophyll with leaf area ranges from 2,025–4500 mm <sup>2</sup> , laminar shape lanceolate, symmetrical, leaf margin entire and wavy	Petiole range is 1–2 x 7–15 mm, it is glabrous; ellipsoidal, lamina can be chartaceous and some are sub coriaceous, ellipsoidal in shape and narrow, some can be lanceolate or can be ellipsoidal while others can be broad, laminar size notophyll with leaf area ranges from 5.5–23.7 x 1.3–9 cm, pale on the lower surface; and glabrous in all sides including the midrib.	Petiole ranges from 9–17 x 2–3 mm; lamina is characterized with sub coriaceous or can be chartaceous, it is oblanceolate in shape or can be ellipsoidal, leaf area ranges from 16.5–35 x 5–9 cm. glaucous in the lower surface,	Petiole ranges from 10–17 x 3 mm, described as glabrous; sub-coriaceous for the lamina, oblong in shape, leaf area ranges from 17.5–33.6 x 4–9.6 cm, glaucous in the lower surface and glabrous in all sides in the midrib.	Petiole ranges from 2–3 x 3–5 mm, thickly tomentose or can be glabrous, covered mostly by a leaf base; lamina can be sub coriaceous or some can be chartaceous, leaf area ranges from 9–31 x 4–10 cm, oblanceolate
Apex of Leaf	Apex angle is acute; shape can be acuminate	Apex acute and can be shortly acuminate	Apex acute to acuminate	Apex acute or acuminate	Apex acute, shortly to abruptly acuminate
Base	Base angle obtuse, and base shape rounded	Base cuneate to subrounded	Base rounded	Base cuneate to sub rounded	Base cordate
Veins order					
1 <sup>o</sup> vein category	Pinnately veined	Pinnately veined	Pinnately veined		Pinnately veined
2 <sup>o</sup> vein category	2 <sup>o</sup> vein category festooned semicraspedodromous, 12–14 pairs, agrophic veins simple, 2 <sup>o</sup> vein spacing irregular, 2 <sup>o</sup> vein angle smoothly decreasing toward the base, inter 2 <sup>o</sup> veins weak inter-secondaries	Secondary veins slender raised above, curved, 6–12 pairs, including with the midrib an angle of about 35–55 degree, glabrous; lateral veins anastomosing inconspicuous	Secondary veins slender raised above, curved, including with the midrib an angle of about 55–60 degree, 14–17 pairs; lateral veins anastomosing inconspicuous.	Secondary veins slender raised above, glabrous, curved, 13–19 pairs, including with the midrib an angle of about 50–60 degree; lateral veins anastomosing.	Secondary veins faint, curved, 10–14 pairs, midrib an angle of about 35–55°, glabrous or densely tomentose; lateral veins anastomosing inconspicuous
3 <sup>o</sup> vein category	3 <sup>o</sup> vein category alternate percurrent, 3 <sup>o</sup> vein coarse sinuous, 3 <sup>o</sup> vein angle to 1 <sup>o</sup> obtuse, 3 <sup>o</sup> vein angle variability inconsistent,	Tertiary veins reticulate.	Tertiary veins are scalariform.	Tertiary veins scalariform	Tertiary veins are scalariform.
4 <sup>o</sup> and 5 <sup>o</sup> vein category	4 <sup>o</sup> and 5 <sup>o</sup> vein category regular polygonal reticulate, and the leaf areolation 5 or more sides.				
Flower	Unknown	Axillary or terminal, single, seldom raceme two –six flowers.	Flowers unknown	Solitary, some can be raceme with three–five flowers	Axillary or terminal, solitary, seldom raceme with two–four flowers.
Petals	Unknown	Three coriaceous, ovate, triangular, lanceolate or rhomboid petals, with or without a distinct claw, 1.2–11 x 1–2.4 cm, thick 0.5–3 mm, a sharp or directly acuminate apex, valvate reduplicate, and puberulent.	Petals unknown	Petals 3, coriaceous, linear lanceolate, 3.3–7 cm x 0.8–1.2 mm, thick c. 1mm, apex described as sharp, with valvate reduplicate, not clearly defined claw, and velutinous.	Three–four petals, some are coriaceous others can be sub-coriaceous, it is lanceolate, size range is 3.5–7 x 1.5–2.4 cm, thickness is 0.5–1 mm, apex described as valvate reduplicate, and acuminate
Sepals	Unknown	Sepal is predominantly ovate, size ranges from 2–4 x 2–5 mm, apex can either be acuminate or acute, rarely pubescent.	Sepal is predominantly ovate, c. 3 x 4 mm, apex acuminate, sparsely pubescent	Sepal is predominantly ovate c. size range is 3–4 x c. 2 mm, apex can be rarely pubescent, and mucronate.	Triangular sepal with size ranges from c. 4 x 4–5 mm, apex can be densely pubescent, sparsely tomentose or acuminate



Plant Morphology (LAWG 1999)	<i>Dasymaschalon leilamericanum</i> sp. nov.	<i>Dasymaschalon clusiflorum</i> (Merr.) Merr.	<i>Dasymaschalon filipes</i> (Ridl.) Ban	<i>Dasymaschalon ellipticum</i> Nurmawati	<i>Dasymaschalon blumei</i> Finet & Gagnep
Stamen	Unknown	Stamens 2–4 mm x c. 0.5–1 mm, apex discoid, glandular dots absent.	Stamens unknown	Stamens size ranges from 23 x c. 1 mm, described as convex apex with the presence of dotted glandular	Stamens 4 x 1 mm, apex convex, glandular dots absent
Pedicels	3–4 cm long	Pedicel 1.2–4.2 cm x 1–2 mm, glabrous.	Pedicel 19–33 cm x c. 1 mm, glabrous (bearing carpidia).	Pedicel ranges from c. 1 mm x 1.5–2 cm and described as glabrous.	Pedicel ranges from 3.4–15 cm x 1.5–2 mm, predominantly tomentose or densely pubescent, and glabrous
Fruits	Axillary or terminal	Axillary or terminal	Axillary or terminal	Axillary or terminal	Axillary or terminal
Monocarps	30–50, ellipsoid 9–20 x 8–13 mm, pinkish to black color	Ranges from 20–50 and described as globose, with size ranges from 7–17 x 5–8 mm	Ranges from 20–35, ellipsoid, with size ranges from 10–14 x 7–9 mm.	Ranges from 20–30, described as ellipsoidal to sub globose, size ranges from 7.5–10 x 6–7.5 mm	Monocarps 7–30
Stalks	Stalks 13 x 38 mm glabrous	Size ranges 8–21 x 1–2 mm, described as rarely pubescent to glabrous	Size ranges from 8–22 x c. 0.5 mm, described as rarely pubescent.		Rarely pubescent, seldom glabrous, size ranges from 4–15 x 1–2 mm
Seeds	5–7 seeds, ellipsoid, embedded in pulpy tissue. Seed dimension 0.7–0.9 cm x 0.5–0.6 cm.	Granulate with 1 (–2) seeds, rarely pubescent to glabrous	Granulate with 1(–2) seeds, villous apiculum, and rarely pubescent.	1(–2) seeds, slightly smooth, glabrous.	Granulate with 2–7 seeds, described as ellipsoidal but seldom globose on each of its segment, size ranges from 7–9 x 5–8 mm.

**Table 3. Maximum likelihood fits of 24 different nucleotide substitution models for the matK genes sequences aligned for *Dasymaschalon leilamericanum* sp. nov.**

Model	#Parameter	BIC	AICc	lnL	Invariant
T92	77	4397.269592	3755.961766	-1800.758018	n/a
T92+G	78	4388.799433	3749.29861	-1796.420642	n/a
T92+I	78	4389.896853	3750.39603	-1796.969352	0.456754048
T92+G+I	79	4399.004029	3751.310358	-1796.420645	9.76544E-06
HKY	79	4406.668791	3758.97512	-1800.253025	n/a
HKY+G	80	4407.962061	3752.075691	-1795.797364	n/a
HKY+I	80	4409.135406	3753.249036	-1796.384037	0.454509194

**Table 4. Maximum Likelihood fits of 24 different nucleotide substitution models for the rbcL genes sequences aligned for *Dasymaschalon leilamericanum* sp. nov.**

Model	#Parameter	BIC	AICc	lnL	Invariant
K2	64	3048.949444	2546.264332	-1208.914456	n/a
T92	65	3050.818567	2540.285826	-1204.918388	n/a
K2+G	65	3052.503191	2541.97045	-1205.7607	n/a
K2+I	65	3053.728609	2543.195868	-1206.373409	0.45697074
T92+G	66	3054.534347	2536.154189	-1201.845649	n/a
T92+I	66	3055.717657	2537.3375	-1202.437304	0.45697074
K2+G+I	66	3062.2175	2543.837343	-1205.687226	9.24534E-06

Table 5. Multivariate analysis of morphological data *Dasymaschalon leilamericanum* sp. nov..

Plant morphology (LAWG 1999)	SS	df	MS	F	P-value	FCrit
Habit	94.49	4	23.62	45.2	0.00	2.87
Leaf pattern	17935657	4	4483914	4.52	0.00	2.87
2 <sup>o</sup> vein category	189.2	4	47.3	13.75	0.00	2.87
Pedicels	2457.68	4	614.42	19.07	0.00	2.87
Monocarps	2290.24	4	572.56	6.23	0.00	2.87
Stalks	4109.44	4	1027.36	5.58	0.00	2.87
Seeds	96.56	4	24.14	23.21	0.00	2.87

**Conservation Status:** The new species *Dasymaschalon leilamericanum* is known only in limestone forest of Mount Lantoy along the river, at an elevation of 99 m. Merrill (1923) designated the three *Dasymaschalon* species found in the Philippines (www.philippineplants.org) as endemic to the country, just like this new species. The *Dasymaschalon clusiflorum* (Merr.), described as endemic in the Philippines, was designated as Least Concern (LC) based on the IUCN Redlist (2020–2) (<https://www.iucnredlist.org/search?q%20query=dasymaschalon&searchType=species>).

The morphological comparison between *Dasymaschalon leilamericanum* (a newly described species) and closely related species—*Dasymaschalon clusiflorum* (Merr.) Merr., *Dasymaschalon filipes* (Ridl.) Ban., *Dasymaschalon ellipticum* Nurmawati, and *Dasymaschalon blumei* Finet & Gagnep—reveals significant differences across various plant characteristics (Meeran et al. 2023) (Table 5). The p-values for the traits Habit, Leaf pattern, 2<sup>o</sup> vein category, pedicels, monocarps, stalks, and seeds are all p-value is 0.00, indicating highly significant morphological divergence between *D. leilamericanum* and the other species. These differences suggest *D. leilamericanum* is a distinct species within the genus *Dasymaschalon*, with its own set of ecological adaptations and evolutionary characteristics. The morphological traits that set *D. leilamericanum* apart provide valuable insights into its functional ecology, reproductive success, and evolutionary history, helping to further refine its taxonomic status and improve our understanding of its role within its habitat.

## Molecular Analyses

### Model Selection for *matK* and *rbcl* genes

Models with the lowest BIC scores (Bayesian Information Criterion) were considered to describe the substitution pattern the best. For each model, the AICc value (Akaike Information Criterion, corrected), the maximum likelihood value (lnL), and the number

of parameters (including branch lengths) are also presented (Nei & Kumar 2000). Non-uniformity of evolutionary rates among sites may be modeled by using a discrete Gamma distribution (+G) with five rate categories and by assuming that a certain fraction of sites are evolutionarily invariable (+I). Whenever applicable, estimates of gamma shape parameters and/or the estimated fraction of invariant sites were shown. Assumed or estimated values of transition/transversion bias (R) were shown for each model, as well. They were followed by nucleotide frequencies (f) and rates of base substitutions (r) for each nucleotide pair. Relative values of instantaneous r should be considered when evaluating them. For simplicity, the sum of r values is made equal to 1 for each model. For estimating ML values, a tree topology was automatically computed. The analysis involved 39 nucleotide sequences. Codon positions included were 1<sup>st</sup>+2<sup>nd</sup>+3<sup>rd</sup>+Noncoding. All positions containing gaps and missing data were eliminated. There was a total of 693 positions for *matK* genes and a total of 581 positions for *rbcl* genes in the final dataset (Tables 3 & 4). Evolutionary analyses were conducted in MEGA7 (Kumar et al 2016).

### Phylogenetic relationships

The study represents the first molecular analysis of *Dasymaschalon* in Cebu Island, Philippines. As shown in reconstructed phylogenetic tree of the *matK* and *rbcl* gene sequences (Figures 1 & 2), *D. leilamericanum* sp. nov. is a new species molecularly related to *Uvaria* species as with other *Dasymaschalon* species. The position of *D. leilamericanum* sp. nov. in the phylogenetic tree is not unusual. Wang et al. (2012) and Guo et al. (2018) described this non-monophyletic characteristic of *Dasymaschalon*, particularly with regards to cpDNA genes. As also suggested by Guo et al. (2018), the incongruence of *Dasymaschalon* might be a result of hybridization with closely-related genera.

The evolutionary history using the *matK* and *rbcl*

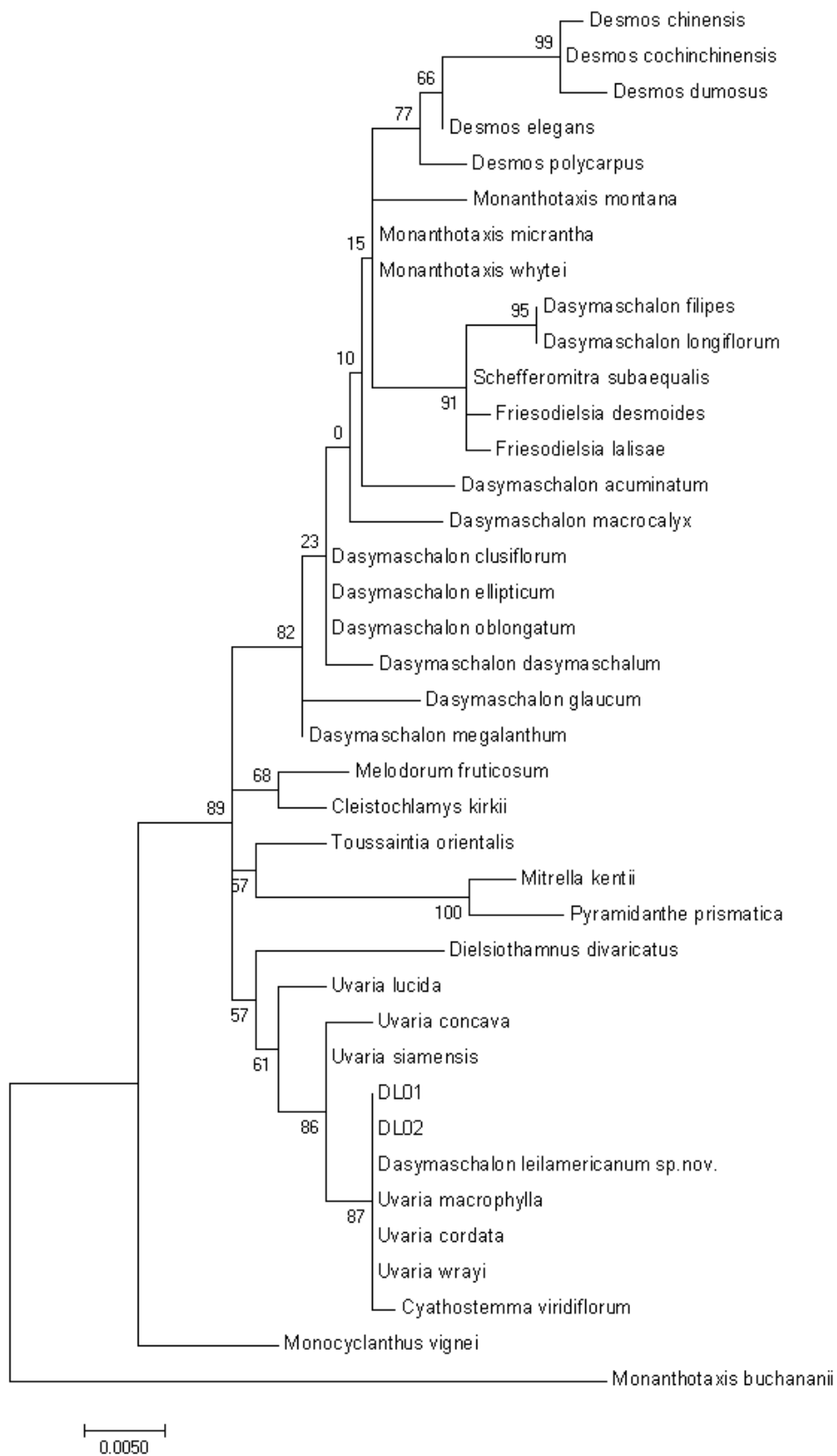


Figure 1. Molecular Phylogenetic analysis of the *matK* gene sequences aligned for *Dasymaschalon leilamericanum* sp. nov. by maximum likelihood method via Tamura 3-parameter model.



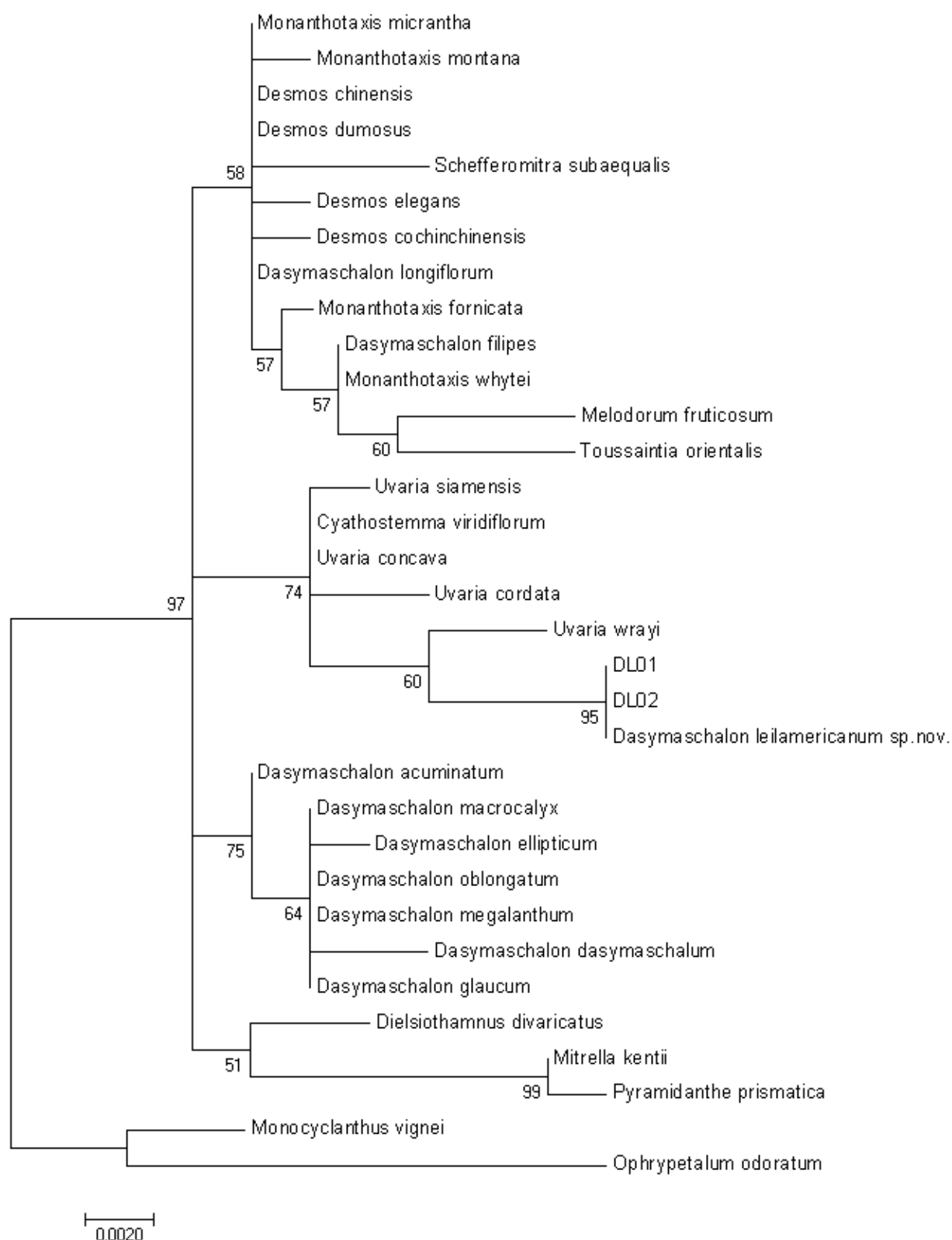


Figure 2. Molecular Phylogenetic analysis of the *rbcl* gene sequences aligned for *Dasymaschalon leilamericanum* sp. nov. by maximum likelihood method via Kimura 2-parameter model.

genes were inferred by using the Maximum Likelihood method based on the Tamura 3-parameter model (Tamura 1992) (Figures 1 & 2). The tree with the highest log likelihood (-1796.97) for *matK* gene and (-1208.91) for *rbcl* gene were shown (Table 3 & 4). The percentage of trees in which the associated taxa clustered together is shown next to the branches. Initial tree(s) for the heuristic search were obtained automatically by applying Neighbor-Join and BioNJ algorithms to a matrix of pairwise distances estimated using the Maximum Composite Likelihood (MCL) approach and then selecting the topology with superior log likelihood value. The tree is drawn to scale, with branch lengths measured in the number of substitutions per site. Evolutionary analyses were conducted in MEGA7 (Kumar et al 2016).

The phylogenetic analyses of Couvreur et al. (2011) are in agreement with the inferred association of *Dasymaschalon* with another clade, containing species from the genera *Uvaria* and *Cyathostemma*, and the clade made up of species from the genera *Monanthes*, *Melodorum*, and *Desmos*. The majority of *Dasymaschalon* species (*D. macrocalyx*, *D. clusiflorum*, and *D. ellipticum*) belong to a single, monophyletic group that is strongly supported. The *D. leilamericanum* demonstrated non-monophyly as it is more closely related to genus *Uvaria* than to the major clade of *Dasymaschalon* or with the clade of *Desmos* and *Monanthes*.

According to Wang et al. (2012), certain Annonaceae species showed some degree of evolutionary flexibility in their morphological differences. A unique example of evolutionary adaptability may be seen in the pollination chamber of the flower in *Dasymaschalon*. Wang et al. (2012) also noted that some *Dasymaschalon* species (*D. tibetense*, *D. filipes*, and *D. longiflorum*) belong to a distinct clade that is closely connected to Asian *Friesodielsia* species. This clade is distinct from the clade that contains the majority of *Dasymaschalon* species. The non-monophyly of the three species indicates a parallel evolution with another lineage where morphological convergence occurs (Zander 2008). The fundamental idea that all species are monophyletic restricts the ability of other species to evolve and their history to be complicated, which could lead to an underestimation of variability within and among closely related taxa (Alström et al. 2011).

## CONCLUSION AND RECOMMENDATION

A new species of *Dasymaschalon* (Annonaceae), *Dasymaschalon leilamericanum*, is described and illustrated with diagnostic characters. Several notable morphological characters are the larger laminar size which belong to notophyll category with an area ranges from 2,025–4,500 mm<sup>2</sup>, laminar length : width ratio of 4:1, 2<sup>o</sup> vein festooned semicraspedodromous, agrophic vein simple, 2<sup>o</sup> vein spacing irregular, 2<sup>o</sup> vein angle smoothly decreasing toward the base, inter 2<sup>o</sup> veins weak intersecondaries, 3<sup>o</sup> vein category alternate percurrent, 3<sup>o</sup> vein coarse sinuous, 3<sup>o</sup> vein angle to 1<sup>o</sup> obtuse, 3<sup>o</sup> vein angle variability inconsistent, 4<sup>o</sup> and 5<sup>o</sup> vein category regular polygonal reticulate, and leaf areolation five or more sides, Monocarps 50–60, ellipsoid 9–20 x 8–13 mm, pinkish to black color, longer fruit pedicel, and 5–7 ellipsoid seeds/monocarp. The significant differences observed in the plant morphology of *D. leilamericanum* compared to *D. clusiflorum*, *D. filipes*, *D. ellipticum*, and *D. blumei*—as indicated by the p-values of 0.000 across key morphological traits (Habit, leaf pattern, 2<sup>o</sup> vein category, pedicels, monocarps, stalks, and seeds) suggest that *D. leilamericanum* is a distinct species within the *Dasymaschalon* genus. These differences highlight the species' unique adaptations to specific ecological conditions, reproductive strategies, and evolutionary pathways. Phylogenetic trees of *matK* and *rbcl* genes showed that *D. leilamericanum* did not match to any species under *Dasymaschalon* but it is closer to genus *Uvaria*. Although the *D. leilamericanum* shares some morphological characteristics with other *Dasymaschalon* species, genetically it is closer to another genus thus the non-monophyletic characteristic exhibited in the phylogenetic tree is unexpected. The DNA barcode established in this study can help enrich the literature on molecular data of Philippine flora. The Mt. Lantoy KBA in Argao, Cebu, Philippines, is becoming a hotspot for biodiversity conservation with the addition of new species. It is recommended that future studies on phylogenetic analyses be conducted on other *Dasymaschalon* species found in the Philippines to understand its intergeneric relationships, endemism, and evolutionary history.

## REFERENCES

- Alström, P., S. Höhna, M. Gelang, P.G.P. Ericson & U. Olsson (2011). Non-monophyly and intricate morphological evolution within the avian family Cettiidae revealed by multilocus analysis of a taxonomically densely sampled dataset. *BMC Evolutionary Biology*

- 11:352. <https://doi.org/10.1186/1471-2148-11-352>
- Ast, S. (1938). Anonacées, pp. 59–123. In: Humbert, H. (wd.) *Flore Générale de l'Indo-Chine*. Suppl. 1. Masson, Paris. <https://doi.org/10.5962/bhl.title.44886>
- Audley-Charles, M.G., D.J. Carter, A.J. Barber, M.S. Norvick & S. Tjokrosapoetro (1979). Reinterpretation of the geology of Seram: implications for the Banda Arc and Northern Australia. *Journal of the Geological Society* 136: 547–568.
- Bân, N.T. (2000). *Flora of Vietnam*, Vol. 1. Science & Technics Published House, Hanoi, pp. 173–187.
- Bân, N.T. (1975). Notes in the genera *Dasymaschalon* (Hook.f et Thoms) Dalla Torre et Harms (*Annonaceae*). *Botanicheskii Zhurnal* 60.2: 224–233.
- Cadiz, G.O. & I.E. Buot Jr (2009). An enumeration of the woody plants of Cantipla forest fragments, Cebu Island, Philippines. *The Thailand Natural History Museum Journal* 4(2): 71–72.
- CI/DENR/PAWB-Haribon (2006). Priority Sites for Conservation in the Philippines: Key Biodiversity Areas. Quezon City, Philippines: Conservation International (CI), Department of Environment and Natural Resources – Protected Areas and Wildlife Bureau (DENR-PAWB), Haribon Foundation for the Conservation of Nature (HARIBON). Retrieved from <http://www.conservation.org/global/philippines/publications/Pages/Priority-Sitesfor-Conservation-Key-Biodiversity-Areas.aspx>.
- Couvreur, T.L.P., M.D. Pirie, L.W. Chatrou, R.M.K. Saunders, Y.C.F. Su, J.E. Richardson & R.H.J. Erkens (2011). Early evolutionary history of the flowering plant family Annonaceae: steady diversification and boreotropical geodispersal. *Journal of Biogeography* 38: 664–680.
- Craib, W.G. (1912). Contributions to the flora of Siam. *Bulletin of Miscellaneous Information* 3: 144–155. <https://doi.org/10.5962/bhl.title.21865>
- de Vere, N. D., T.C. Rich, S.A. Trinder & C. Long (2015). DNA barcoding for plants. In *Plant Genotyping* pp. 101–118. Humana Press, New York, 118 pp.
- Dalla-Torre, C.W. & H. Harms (1901). *Genera siphonogamarum ad systema Englerianum conscripta*, Part 3. Engelmann, Leipzig, pp. 172–175. <https://doi.org/10.5962/bhl.title.26684>
- Doyle, J. & A. Le Thomas (2012). Evolution and phylogenetic significance of pollen in Annonaceae. *Botanical Journal of the Linnean Society* 169: 190–221. <https://doi.org/10.1111/j.1095-8339.2012.01241.x>
- Edgar, R.C. (2004). MUSCLE: multiple sequence alignment with high accuracy and high throughput. *Nucleic Acids Research* 32(5): 1792–1797.
- Finet, A. & F. Gagnepain (1906). Contributions à l'étude de la flore de l'Asie orientale. *Bulletin de la Société Botanique de France* 53 (Mémoires 4): 55–170 + pl. 9–20.
- Fries, R.E. (1959). Annonaceae. In: Melchior, H. (Ed.). *Die Natürlichen Pflanzenfamilien*. Duncker & Humblot, Berlin, pp. 1–170.
- Guo, X., D.C. Thomas & R.M.K. Saunders (2018). Gene tree discordance and coalescent methods support ancient intergeneric hybridisation between *Dasymaschalon* and *Friesodielsia* (Annonaceae). *Molecular Phylogenetics and Evolution* 127: 14–29.
- Hernandez, J.O., L.S.J. Maldia, D.E. Pulan, I.E. Buot Jr. & B.B. Park (2020). Leaf architecture and petiole anatomy of Philippine Dipterocarpus species (Dipterocarpaceae). *Bangladesh Journal of Plant Taxonomy* 27(1): 1–14.
- Hooker, J.D. & T. Thomson (1855). *Flora Indica*: being a systematic account of the plants of British India 1. Pamplin, London, 285 pp. <https://doi.org/10.5962/bhl.title.57706>
- Hutchinson, J. (1923). Contributions towards a phylogenetic system of flowering plants, 2. The genera of Annonaceae. *Bulletin of Miscellaneous Information* 1923: 241–261. <https://doi.org/10.2307/4120580>
- Kebler, P.J.A. (1993). Annonaceae, pp. 93–129. In: Kubitzki, K., G. Rohrer & V. Bittrich (ed.). *The Families and Genera of Vascular Plants: Flowering Plants, Dicotyledons. Magnoliid, Hamamelid and Caryophyllid Families* 2. Springer-Verlag, Berlin, 653 pp.
- Klucking, E.P. (1986). *Leaf venation patterns 1: Annonaceae*. J. Cramer, Berlin & Stuttgart.
- Koek-Noorman, J., A.K.V. Setten & C.M.V. Zuilen (1997). Studies in Annonaceae XXVI. Flower and fruit morphology in Annonaceae. Their contribution to patterns in cluster analysis. *Botanisches Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographi* 119: 213–230.
- Kimura, M. (1980). A simple method for estimating evolutionary rate of base substitutions through comparative studies of nucleotide sequences. *Journal of Molecular Evolution* 16:111–120.
- Kumar, S., G. Stecher & K. Tamura (2016). MEGA7: Molecular Evolutionary Genetics Analysis version 7.0 for bigger datasets. *Molecular Biology and Evolution* 33:1870–1874.
- LAWG (1999). *Manual of Leaf architecture — Morphological Description and Categorization of Dicotyledonous and Net-Veined Monocotyledonous Angiosperms*. Leaf Architecture Working Group, Smithsonian Institution, 65 pp.
- Le Thomas, A. (1980). Ultrastructural characters of the pollen grains of African Annonaceae and their significance for the phylogeny of primitive angiosperms: first part. *Pollen & Spores* 22: 267–342.
- Li, P.T. (1993). Novelities in Annonaceae from Asia. *Guihaia* 13: 311–315.
- Lillo, E.P., A.B. Malaki, S.M.T. Alcazar, R.U. Nuevo & R. Rosales (2019). Native Trees on Mount Lantoy Key BiodiversityAreas (KBA), Argao, Cebu, Philippines. *Philippine Journal of Science* 148(2): 359–371.
- Lillo, E.P., A.B. Malaki, S.M.T. Alcazar, B. Redoblado, J.L. Diaz, J.P. Pinote, R. Rosales & I.E. Buot Jr (2020). Native tress in Nug-as forest Key Biodiversity Area, Cebu, Philippines. *Biodiversitas* 21(9): 4162–4167.
- Lillo, E.P., A.B. Malaki, S.M.T. Alcazar, R. Rosales, B.R. Redoblado, J.L.B. Diaz, E.M. Pantinople & I.E. Buot Jr (2021). Inventory of native and mother trees in Key Biodiversity Areas of Cebu Island, Philippines for species selection in local reforestation programs. *Biodiversitas* 22(11): 4740–4749. <https://doi.org/10.13057/biodiv/d221105>
- Loureiro, J. (1790). *Flora Cochinchinensis*, Vol. 1. Ulyssipone, Lisbon, 353 pp. <https://doi.org/10.5962/bhl.title.40199>
- Mallari, N.A.D., B.R. Tabaranza Jr. & M.J. Crosby (2001). *Key Conservation Sites in the Philippines: A Haribon Foundation and Bird Life International Directory of Important Bird Areas*. Lepiten-Tabao M, Gee GA eds. Makati City, Philippines: Bookmark, Inc. 484p.
- Malaki, A.B., R.V. Cruz, Bantayan, D.A. Racelis, I.E. Buot, Jr. & L.M. Florece (2018). Factors Affecting the spatial distribution of Black Shama *Copsychus cebuensis* Steere, 1890 in Argao Watershed Reserve. *Philippine Journal of Science* 147: 175–189.
- Masungsong, L.A., M. Belarmino & I.E. Buot Jr. (2019). Delineation of the selected *Cucumis* L. species and accessions using leaf architecture characters. *Biodiversitas* 20: 629–635.
- Maxwell, J.F. (1989). Botanical notes on the vascular flora of Chiang Mai Province, Thailand. *Natural History Bulletin of the Siam Society* 37: 177–185.
- Meeran, M., A., Sami, M. Haider, & M. Umar (2023). Multivariate analysis for morphological traits of *Amaranthus viridis*. *Bulletin of Biological and Allied Sciences Research* 8: 46. <https://doi.org/10.54112/bbasr.v2023i1.46>
- Merrill, E.D. (1915). Studies on Philippine Annonaceae, I. *Philippine Journal of Science, Section C. Botany* 10: 227–264.
- Merrill, E.D. (1923). *An Enumeration of Philippine Flowering Plants*, Vol. 2. Manila, Philippines: Bureau of Printing, 530 pp.
- Morán-Ordoñez, A. (2020). Conservation of “new” species within and beyond protected areas. *Animal Conservation* 23: 353–354.
- Nei, M. & S. Kumar (2000). *Molecular Evolution and Phylogenetics*. Oxford University Press, New York. Provide page numbers.
- Ngoc-Dai, D.O., L.Y. Ngoc-Sam, L.E. Thi-Huong, B.A. Troung & Vuongh (2018). *Dasymaschalon bachmaensis* (Annonaceae), a new species from Bạch Mã National Park, North Central Coast region, Vietnam. *Phytotaxa* 379(1): 049–056. <https://doi.org/10.11646/phytotaxa.379.1.4>
- Nurmawati, S. (2003). Malesian species of *Dasymaschalon*



- (Annonaceae). *Floribunda* 2(3): 67–81.
- Pelser, P.B. & J.F. Barcelona (2017). Base of leaflets. Retrieved from [www.phytoimages.siu.edu](http://www.phytoimages.siu.edu). Accessed 2 June 2019).
- Pi, E.X., Q.F. Peng, H.F. Lu, J.B. Shen. & Y.Q. Du (2009). Leaf morphology and anatomy of *Camellia* section *Camellia* (Theaceae). *Botanical Journal of the Linnean Society* 159: 456–476.
- Quimio, J. (2006). Abundance status of flora in Managa-Kotkot-Lusaran watersheds, Cebu, Philippines. *Annals of Tropical Research* 28(2): 53–75.
- Rosales, R.C., E. Lillo, S.M. Alcazar, L. Colita, J. Caballero & A.B. Malaki (2020). Species composition, relative abundance, and distribution of land snail species in Mt. Lantoy Key Biodiversity Area, Cebu, Philippines. *Biodiversitas* 21: 5438–5447.
- Safford, W.E. (1912). *Desmos* the proper generic name for the so-called *Unonas* of the Old World. *Torrey Botanical Society* 39: 501–508. <https://doi.org/10.2307/2479122>
- Simkins, A.T., G.M. Buchanan, R.G. Davies & P.F. Donald (2020). The implications for conservation of a major taxonomic revision of the world's birds. *Animal Conservation* 23: 345–352.
- Sinclair, J. (1955). A revision of the Malayan Annonaceae. *Gardens' Bulletin Singapore* 14: 149–516.
- Sun, T.X., H. Wu, P.T. Li, J. Sun & X.F. Zheng (2002). Leaf anatomy of *Desmos* and *Dasymaschalon* (Annonaceae) from China in relation to taxonomic significance. *Acta Phytotaxonomica Sinica* 40: 385–395.
- Tran, T.K.P., T.T.T. Vu & S. Widiarsih (2021). Comparison of *matK* and *rbcl* DNA barcodes for genetic classification of jewel orchid accessions in Vietnam. *Journal of Genetic Engineering and Biotechnology* 19: 1–8.
- Tsiang, Y. & P.T. Li (1979). Annonaceae, pp. 10–175. In: Tsiang, Y. & P.T. Li (eds.). *Flora Reipublicae Popularis Sinicae. Vol. 30 (2)*. Science Press, Beijing.
- Van Heusden, E.C.H. (1992). Flowers of Annonaceae: morphology, classification, and evolution. *Blumea Supplement* 7: 1–218.
- Walker, J.W. (1971). Pollen morphology, phytogeography, and phylogeny of the Annonaceae. *Contributions from the Gray Herbarium of Harvard University* 202: 1–131.
- Wang, J., P. Chalermglin & R.M.K. Saunders (2009). The genus *Dasymaschalon* (Annonaceae) in Thailand. *Systematic Botany* 34: 252–265.
- Wang, J., D.C. Thomas, Y.C.F. Su, S. Meinke, L.W. Chatrou & R.M.K. Saunders (2012). A plastid DNA phylogeny of *Dasymaschalon* (Annonaceae) and allied genera: evidence for generic non-monophyly and the parallel evolutionary loss of inner petals. *Taxon* 61(3): 545–558. <https://doi.org/10.1002/tax.613005>
- Yu, J., J.H. Xue & S.L. Zhou (2011). New universal *matK* primers for DNA barcoding angiosperms. *Journal of Systematics and Evolution* 49: 176–181.
- Zander, R.H. (2008). Evolutionary inferences from non-monophyly on molecular trees. *Taxon* 57(4): 1182–1188. <https://doi.org/10.1002/tax.574011>

**Author details:** RAAMAH ROSALES, holds a PhD degree in biology and is the project leader of the study on DNA Barcoding of endemic flora in Cebu Island, Philippines. His focus of research is on biology conservation and ecosystem resiliency. DR. EDGARDO LILLO is a licensed forester who has extensive study on Philippine flora. DR. ARCHIEBALD BALTAZAR MALAKI is the program leader of the flora and fauna assessment in Cebu Island. DR. STEVE MICHAEL ALCAZAR is involved on Cebu Island conservation and passionate about plant-animal interaction. MR. BERNARDO REDOBLADO is a licensed forester and involved in many biodiversity assessment projects. MR. JOHN LOU DIAZ is also a forester and assisted several biodiversity assessment in the island. DR. INOCENCIO BUOT JR. is a highly respected researcher whose expertise include taxonomy, plant biology, and ecosystem management. DR. RICHARD PARILLA is an expert in DNA barcoding and involved in conservation projects on flora and fauna in neighboring islands. DR. JESSICA REY is a widely published researcher with studies on molecular analyses on plant taxonomy, diseases, and gene expression.

**Author contributions:** RR—project leader, molecular analysis and paper writing; EL—data collection, morphological analysis and paper writing; ABM—guidance in research methodology; SMA—guidance in data collection; BR—specimen collection and morphological analysis; JLD—specimen collection and morphological analysis; IBJR—guidance in research methodology; RP—molecular analysis and paper writing; JR—DNA extraction, molecular analysis



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 D.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. 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 Dhabi, 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 2021–2023

Due to pausity of space, the list of reviewers for 2021–2023 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,  
3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore,  
Tamil Nadu 641006, India  
ravi@threatenedtaxa.org & ravi@zooreach.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](http://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 2025 | Vol. 17 | No. 3 | Pages: 26571–26762

Date of Publication: 26 March 2025 (Online & Print)

DOI: 10.11609/jott.2025.17.3.26571-26762

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

## Articles

### *Dasymaschalon leilamericanum* (Annonaceae), a new species with evidence of non-monophyly from Mount Lantoy Key Biodiversity Area, Philippines

– Raamah Rosales, Edgardo Lillo, Archiebald Baltazar Malaki, Steve Michael Alcazar, Bernardo Redoblado, John Lou Diaz, Inocencio Buot Jr., Richard Parilla & Jessica Rey, Pp. 26571–26586

### Association analysis of *Castanopsis tungurur* and the neighboring vegetation community in Cibodas Biosphere Reserve, Indonesia

– Dian Ridwan Nurdiana & Inocencio E. Buot, Jr., Pp. 26587–26598

### Riparian flora of Haveri District, Karnataka, India

– Ningaraj S. Makanur & K. Kotresha, Pp. 26599–26615

### Conservation strategies for *Vatica lanceifolia* (Roxb.) Blume: habitat distribution modelling and reintroduction in northeastern India

– Puranjoy Mipun, Amritee Bora, Piyush Kumar Mishra, Baby Doley & Rinku Moni Kalita, Pp. 26616–26626

### Patterns and economic impact of livestock predation by large carnivores in protected areas of southern Kashmir, India

– Lubna Rashid & Bilal A. Bhat, Pp. 26627–26635

### People perception on use patterns and conservation of Chinese Pangolin in and around Yangoupokpi Lokchao Wildlife Sanctuary, Manipur, India

– Yengkhom Roamer Zest, Awadhesh Kumar, Om Prakash Tripathi, Rakesh Basnett & Dipika Parbo, Pp. 26636–26647

## Communications

### Population status, threats, and conservation of *Trachycarpus takil*: an endemic and threatened plant species in western Himalaya, India

– Himani Tiwari, Dhani Arya & K. Chandra Sekar, Pp. 26648–26654

### A checklist of fishes of Haiderpur wetland, western Uttar Pradesh, India

– Rahul Rana, Jeyaraj Antony Johnson & Syed Ainul Hussain, Pp. 26655–26668

### An avifaunal checklist of the Zaskar Region, Ladakh Himalaya, India

– Abid Hussain, Zakir Hussain & Mumtaz Ali, Pp. 26669–26679

### Breeding tern colonies on the sandbars of Adam's Bridge, India: new records and significance

– H. Byju, H. Maitreyi, N. Raveendran, D.A. Marshal & S. Ravichandran, Pp. 26680–26689

### Assessment of nest and nesting activities of White-bellied Heron *Ardea insignis* Hume, 1878 (Aves: Ardeidae) in the broad-leaved forests of northeastern India

– Himadri Sekhar Mondal & Gopinathan Maheswaran, Pp. 26690–26696

### Preliminary checklist of avifauna from All India Institute of Medical Sciences, Guwahati, Assam, India

– Nitul Ali, Vivek Chetry, Prem Kishan Singha & Maina Boro, Pp. 26697–26703

### Implementation strategy and performance analysis of a novel ground vibration-based elephant deterrent system

– Sanjoy Deb, Ramkumar Ravindran & Saravana Kumar Radhakrishnan, Pp. 26704–26714

## Short Communications

### *Blackwellomyces pseudomilitaris* (Hywel-Jones & Sivichai) Spatafora & Luangsa-ard, 2017 (Sordariomycetes: Hypocreales: Cordycipitaceae): first report from Western Ghats of India

– Anjali Rajendra Patil, Snehal Sudhir Biranje, Mahesh Yashwant Borde & Yogesh Sadashiv Patil, Pp. 26715–26720

### *Calvatia craniiformis* (Schwein.) Fr. ex De Toni (Agaricomycetes:

Lycoperdaceae): a new puffball mushroom record from eastern India

– Asit Mahato, Pritish Mitra, Sabyasachi Chatterjee & Subrata Raha, Pp. 26721–26726

### Rediscovery of the gypsy moth *Lymantria kanara* Collenette, 1951 (Insecta: Lepidoptera: Erebidæ) from Kerala, India, after 73 years and its taxonomic redescription

– P.K. Adarsh & Abhilash Peter, Pp. 26727–26730

### Nest predation by *Vespa tropica* (Linnaeus, 1758): observational insights into polistine wasp defense and hornet feeding behavior

– Shantam Ojha & Vartika Negi, Pp. 26731–26736

### The discovery of a male Malay Crestless Fireback *Lophura erythrophthalma* (Raffles, 1822) (Aves: Galliformes: Phasianidae) at Ulu Sat Forest Reserve, Machang, Kelantan, Peninsular Malaysia

– Ainun Hidayah Wahad, Wan Hafiz Idzni Wan Mohammad Hizam, Muhammad Hamirul Shah Ab Razak, Aainaa Amir, Kamarul Hambali, Hazizi Husain, Mohd Saupi Abdullah, Ehwan Ngadi, Mohamad Arif Iskandar Abdul Wahab & Asrulsani Jambari, Pp. 26737–26740

## Notes

### New distribution record of *Korthalsia rogersii* Becc, a threatened endemic climbing palm of Andaman archipelago

– Paremmal Sarath, Azhar Ali Ashraf, V.B. Sreekumar, Modhumita Ghosh Dasgupta & Suma Arun Dev, Pp. 26741–26743

### Clarifying the nomenclature of Roxburgh's pivotal name *Holigarna racemosa* Roxb. (Anacardiaceae)

– Shruti Kasana, Pp. 26744–26746

### First confirmed breeding of Brown Noddy *Anous stolidus* in southeastern India: a new record from Adam's Bridge

– H. Byju, H. Maitreyi, N. Raveendran & D.A. Marshal, Pp. 26747–26749

### First record of Painted Stork *Mycteria leucocephala* in Indonesia

– Hasri Abdillah, Iwan Febrianto, Cipto Dwi Handono, Fajar Shiddiq, Febryansah Abdillah Harahap & Muhammad Iqbal, Pp. 26750–26752

### New sighting and conservation implications of the endemic Sulu Boobook *Ninox reyi* Oustalet, 1880 at Bolobok Rock Shelter, a key archaeological site in the Sulu Archipelago, southern Philippines

– Fauriza J. Saddari, Yennyryza T. Abduraup, Adzmer A. Juaini, Roger A. Irlis, Khalid D. Adam, Mary Joyce Z. Guinto-Sali & Richard N. Muallil, Pp. 26753–26756

### The occurrence of Glossy Ibis *Plegadis falcinellus* Linnaeus, 1766

(Pelecaniformes: Threskiornithidae) in southern Sumatra, Indonesia

– Muhammad Iqbal, Arum Setiawan, Putri Balqis, Exaudi Beatrice Simanullang, Pormansyah, Selamat Robinsa, Winda Indriati & Indra Yustian, Pp. 26757–26760

## Book Review

### A whisper of silken wings

– Aparna Sureshchandra Kalawate & Pooja Kumar Misal, Pp. 26761–26762

Publisher & Host



Threatened Taxa