ISSN 0972-1800



VOLUME 22, NO. 3

QUARTERLY

JULY-SEPTEMBER, 2020



Date of Publication: 28th September, 2020

BIONOTES

A Quarterly Newsletter for Research Notes and News On Any Aspect Related with Life Forms

BIONOTES articles are abstracted/indexed/available in the Indian Science Abstracts, INSDOC; Zoological Record; Thomson Reuters (U.S.A); CAB International (U.K.); The Natural History Museum Library & Archives, London: Library Naturkundemuseum, Erfurt (Germany) etc. and online databases.

Founder Editor

Dr. R. K. Varshney, Aligarh, India

Board of Editors

Peter Smetacek, Bhimtal, India

V.V. Ramamurthy, New Delhi, India

Jean Haxaire, Laplune, France

Vernon Antoine Brou, Jr., Abita Springs, U.S.A.

Zdenek F. Fric, Ceske Budejovice, Czech Republic

Stefan Naumann, Berlin, Germany

R.C. Kendrick, Hong Kong SAR

Publication Policy

Information, statements or findings published are the views of its author/ source only.

Manuscripts

Please E-mail to petersmetacek@gmail.com.

Guidelines for Authors

BIONOTES publishes short notes on any aspect of biology. Usually submissions are reviewed by one or two reviewers.

Kindly submit a manuscript after studying the format used in this journal (<u>http://www.entosocindia.org/</u>). Editor reserves the right to reject articles that do not adhere to our format. Please provide a contact telephone number. Authors will be provided with a pdf file of their publication.

Address for Correspondence

Butterfly Research Centre, Bhimtal, Uttarakhand 263 136, India. Phone: +91 8938896403.

Email: <u>butterflyresearchcentre@gmail.com</u>

From Volume 21

Published by the Entomological Society of India (ESI), New Delhi (Nodal Officer: V.V. Ramamurthy, ESI, New Delhi)

And

Butterfly Research Centre, Bhimtal Executive Editor: Peter Smetacek Assistant Editor: Shristee Panthee Butterfly Research Trust, Bhimtal

Published by Dr. R.K. Varshney, A Biologists Confrerie, Raj Bhawan, Manik Chowk, Aligarh (up to volume 20 (2018)) R.N.I. Registration No. 71669/99.

Cover Photo of Spialia zebra by Mukesh Panwar

TABLE OF CONTENTS

FIRST RECORD OF RED IMPERIAL BUTTERFLY SUASA LISIDES (INSECTA: LEPIDOPTERA: LYCAENIDAE) FROM TRIPURA, NORTH-EAST INDIA by Nihar Chardra Deb & Sudipta Mandal 110 ADDITION OF THE BUTTERFLY APPIAS GALBA (WALLACE, 1867) TO THE FAUNA OF MANIPUR, INDIA by Jatishwor Singh Irungbam, Harmenn Huidrom & Premjit Singh Elangbam 112 FIRST RECORD OF DODONA DIPOEA HEWITSON, [1866] (LEPIDOPTERA: RIDDINIDA: NEMEGOBINAE) FROM MEGHALAYA, NORTH-EASTERN INDIA by Atau Bora, Laishram Ricky Meitei, Sachin Sharma, Suman Bhowmik & Ngangom Aomoa				
by Nihar Chandra Deb & Sudipta Mandal 110 ADDITION OF THE BUTTERFLY APPIAS GALBA (WALLACE, 1867) TO THE FAUNA OF MANIPUR, INDIA by Jatishwor Singh Irungbam, Harmenn Huidrom & Premjit Singh Elangbam 112 FIRST RECORD OF DODONA DIPOEA HEWITSON, [1866] (LEPIDOPTERA: RIDDINIDAE: NEMEOBIINAE) FROM MEGHALAYA, NORTHEASTERN INDIA by Atanu Bora, Laishram Ricky Meitei, Sachin Sharma, Suman Bhowmik & Ngangom Aomoa 				
MANIPUR, INDIA by Jatishwor Singh Irungbam, Harmenn Huidrom & Premjit Singh Elangbam 112 FIRST RECORD OF DODONA DIPOEA HEWITSON, [1866] (LEPIDOPTERA: RIODINIDAE: NEMEOBIINAE) FROM MEGHALAYA, NORTHEASTERN INDIA by Ataun Bora, Laishram Ricky Meitei, Sachin Sharma, Suman Bhowmik & Ngangom Aomoa				
FIRST RECORD OF DODONA DIPOEA HEWITSON, [1866] (LEPIDOPTERA: RIODINIDAE: NEMEOBIINAE) FROM MEGHALAYA, NORTHEASTERN INDIA by Atanu Bora, Laishram Ricky Meitei, Sachin Sharma, Suman Bhowmik & Ngangom Aomoa 				
RIODINIDAE: NEMEOBIINAE) FROM MEGHALAYA, NORTHEASTERN INDIA by Atanu Bora, Laishram Ricky Meitei, Sachin Sharma, Suman Bhowmik & Ngangom Aomoa 	by Jatishwor Singh Irungbam, Harmenn Huidrom & Premjit Singh Elangbam 112			
(LEPIDOPTERA: CRAMBIDAE) FROM KERALA 111 by Abdulla Paleri, Md. Jahir Rayhan & Amal Ev 117 GECKO EATS ABDOMEN OF ASOTA CARICAE (FABRICIUS, 1775) (LEPIDOPTERA: EREBIDAE: AGANAINAE) by Sem Cordial 119 RANGE EXTENSION OF PURPLE SWIFT CALTORIS TULSI DE NICÉVILLE (LEPIDOPTERA: HESPERIIDAE) TO THE WESTERN HIMALAYA by Shankar Kumar, Raj Shekhar Singh, Paramjit Singh & Sundar Kumar 121 ERANTHEMUM ROSEUM (ACANTHACEAE) A NEW LARVAL HOST PLANT FOR THE CHOCOLATE PANSY BUTTERFLY JUNONIA IPHITA (LEPIDOPTERA: NYMPHALIDAE) by Raju Kasambe 125 NEEM FLOWERS (AZADIRACHTA INDICA) AS AN ABUNDANT SOURCE OF NECTAR FOR BUTTERFLIES IN AN URBAN LANDSCAPE IN DELHI, INDIA 128 REDISCOVERY OF THE ASSAM FLASH BUTTERFLY RAPALA TARA (LEPIDOPTERA: LYCAENIDAE) FROM UTTARAKHAND, INDIA 135 by Rajesh Chaudhary 128 NEDISCOVERY OF THE ASSAM FLASH BUTTERFLY RAPALA TARA (LEPIDOPTERA: LYCAENIDAE) FROM UTTARAKHAND, INDIA 135 by Gaurav Joshi 135 INDIAN TREE FROG POLYPEDATES MACULATUS CAPTURING AND SWALLOWING A LIVE GECKO 136 by Priyadarshini Supekar & Raju Kasambe 136 NEW LARVAL HOST PLANT OF TRYPANOPHORA SEMIHYALINA KOLLAR [1844] 138 FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA 138 by Arajush Payra 138	RIODINIDAE: NEMEOBIINAE) FROM MEGHALAYA, NORTHEASTERN INDIA by Atanu Bora, Laishram Ricky Meitei, Sachin Sharma, Suman Bhowmik & Ngangom Aomoa			
by Abdulla Paleri, Md. Jahir Rayhan & Amal Ev117GECKO EATS ABDOMEN OF ASOTA CARICAE (FABRICIUS, 1775) (LEPIDOPTERA: EREBIDAE: AGANAINAE) by Sem Cordial119RANGE EXTENSION OF PURPLE SWIFT CALTORIS TULSI DE NICÉVILLE (LEPIDOPTERA: HESPERIIDAE) TO THE WESTERN HIMALAYA by Shankar Kumar, Raj Shekhar Singh, Paramjit Singh & Sundar Kumar121ERANTHEMUM ROSEUM (ACANTHACEAE) A NEW LARVAL HOST PLANT FOR THE CHOCOLATE PANSY BUTTERFLY JUNONIA IPHITA (LEPIDOPTERA: NYMPHALIDAE) by Raju Kasambe125NEEM FLOWERS (AZADIRACHTA INDICA) AS AN ABUNDANT SOURCE OF NECTAR FOR BUTTERFLIES IN AN URBAN LANDSCAPE IN DELHI, INDIA by Rajesh Chaudhary128REDISCOVERY OF THE ASSAM FLASH BUTTERFLY RAPALA TARA (LEPIDOPTERA: LYCAENIDAE) FROM UTTARAKHAND, INDIA by Gaurav Joshi135INDIAN TREE FROG POLYPEDATES MACULATUS CAPTURING AND SWALLOWING A LIVE GECKO by Priyadarshini Supekar & Raju Kasambe136NEW LARVAL HOST PLANT OF TRYPANOPHORA SEMIHYALINA KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL NDIA by Arajush Payra138FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana141 <i>ERANTHEMUM ROSEUM</i> (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844				
EREBIDAE: AGANAINAE) by Sem Cordial119RANGE EXTENSION OF PURPLE SWIFT CALTORIS TULSI DE NICÉVILLE (LEPIDOPTERA: HESPERIIDAE) TO THE WESTERN HIMALAYA by Shankar Kumar, Raj Shekhar Singh, Paramjit Singh & Sundar Kumar121ERANTHEMUM ROSEUM (ACANTHACEAE) A NEW LARVAL HOST PLANT FOR THE CHOCOLATE PANSY BUTTERFLY JUNONIA IPHITA (LEPIDOPTERA: NYMPHALIDAE) by Raju Kasambe125NEEM FLOWERS (AZADIRACHTA INDICA) AS AN ABUNDANT SOURCE OF NECTAR FOR BUTTERFLIES IN AN URBAN LANDSCAPE IN DELHI, INDIA by Rajesh Chaudhary128REDISCOVERY OF THE ASSAM FLASH BUTTERFLY RAPALA TARA (LEPIDOPTERA: LYCAENIDAE) FROM UTTARAKHAND, INDIA by Gaurav Joshi135INDIAN TREE FROG POLYPEDATES MACULATUS CAPTURING AND SWALLOWING A LIVE GECKO by Priyadarshini Supekar & Raju Kasambe136NEW LARVAL HOST PLANT OF TRYPANOPHORA SEMIHYALINA KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra138FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana141ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844				
RANGE EXTENSION OF PURPLE SWIFT CALTORIS TULSI DE NICÉVILLE (LEPIDOPTERA: HESPERIIDAE) TO THE WESTERN HIMALAYA by Shankar Kumar, Raj Shekhar Singh, Paramjit Singh & Sundar Kumar 121 <i>ERANTHEMUM ROSEUM</i> (ACANTHACEAE) A NEW LARVAL HOST PLANT FOR THE CHOCOLATE PANSY BUTTERFLY <i>JUNONIA IPHITA</i> (LEPIDOPTERA: NYMPHALIDAE) by Raju Kasambe 125 NEEM FLOWERS (<i>AZADIRACHTA INDICA</i>) AS AN ABUNDANT SOURCE OF NECTAR FOR BUTTERFLIES IN AN URBAN LANDSCAPE IN DELHI, INDIA by Rajesh Chaudhary 128 REDISCOVERY OF THE ASSAM FLASH BUTTERFLY <i>RAPALA TARA</i> (LEPIDOPTERA: LYCAENIDAE) FROM UTTARAKHAND, INDIA by Gaurav Joshi 135 INDIAN TREE FROG <i>POLYPEDATES MACULATUS</i> CAPTURING AND SWALLOWING A LIVE GECKO by Priyadarshini Supekar & Raju Kasambe 136 NEW LARVAL HOST PLANT OF <i>TRYPANOPHORA SEMIHYALINA</i> KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra 138 FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (<i>STICHOPHTHALMA</i> <i>CAMADEVA</i>) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana 141 <i>ERANTHEMUM ROSEUM</i> (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY <i>KALLIMA HORSFIELDII</i> KOLLAR, 1844				
(LEPIDOPTERA: HESPERIIDAE) TO THE WESTERN HIMALAYA by Shankar Kumar, Raj Shekhar Singh, Paramjit Singh & Sundar Kumar121ERANTHEMUM ROSEUM (ACANTHACEAE) A NEW LARVAL HOST PLANT FOR THE CHOCOLATE PANSY BUTTERFLY JUNONIA IPHITA (LEPIDOPTERA: NYMPHALIDAE) by Raju Kasambe125NEEM FLOWERS (AZADIRACHTA INDICA) AS AN ABUNDANT SOURCE OF NECTAR FOR BUTTERFLIES IN AN URBAN LANDSCAPE IN DELHI, INDIA by Rajesh Chaudhary128REDISCOVERY OF THE ASSAM FLASH BUTTERFLY RAPALA TARA (LEPIDOPTERA: LYCAENIDAE) FROM UTTARAKHAND, INDIA by Gaurav Joshi135INDIAN TREE FROG POLYPEDATES MACULATUS CAPTURING AND SWALLOWING A LIVE GECKO by Priyadarshini Supekar & Raju Kasambe136NEW LARVAL HOST PLANT OF TRYPANOPHORA SEMIHYALINA KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra138FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana141ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844	by Sem Cordial 119			
by Shankar Kumar, Raj Shekhar Singh, Paramijit Singh & Sundar Kumar121ERANTHEMUM ROSEUM (ACANTHACEAE) A NEW LARVAL HOST PLANT FOR THE CHOCOLATE PANSY BUTTERFLY JUNONIA IPHITA (LEPIDOPTERA: NYMPHALIDAE) by Raju Kasambe125NEEM FLOWERS (AZADIRACHTA INDICA) AS AN ABUNDANT SOURCE OF NECTAR FOR BUTTERFLIES IN AN URBAN LANDSCAPE IN DELHI, INDIA by Rajesh Chaudhary128REDISCOVERY OF THE ASSAM FLASH BUTTERFLY RAPALA TARA (LEPIDOPTERA: LYCAENIDAE) FROM UTTARAKHAND, INDIA by Gaurav Joshi135INDIAN TREE FROG POLYPEDATES MACULATUS CAPTURING AND SWALLOWING A LIVE GECKO by Priyadarshini Supekar & Raju Kasambe136NEW LARVAL HOST PLANT OF TRYPANOPHORA SEMIHYALINA KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA138FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana141ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844				
CHOCOLATE PANSY BUTTERFLY JUNONIA IPHITA (LEPIDOPTERA: NYMPHALIDAE) by Raju Kasambe 125 NEEM FLOWERS (AZADIRACHTA INDICA) AS AN ABUNDANT SOURCE OF NECTAR FOR BUTTERFLIES IN AN URBAN LANDSCAPE IN DELHI, INDIA by Rajesh Chaudhary 128 REDISCOVERY OF THE ASSAM FLASH BUTTERFLY <i>RAPALA TARA</i> (LEPIDOPTERA: LYCAENIDAE) FROM UTTARAKHAND, INDIA by Gaurav Joshi 135 INDIAN TREE FROG <i>POLYPEDATES MACULATUS</i> CAPTURING AND SWALLOWING A LIVE GECKO by Priyadarshini Supekar & Raju Kasambe 136 NEW LARVAL HOST PLANT OF <i>TRYPANOPHORA SEMIHYALINA</i> KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra 138 FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (<i>STICHOPHTHALMA</i> <i>CAMADEVA</i>) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana 141 <i>ERANTHEMUM ROSEUM</i> (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY <i>KALLIMA HORSFIELDII</i> KOLLAR, 1844				
FOR BUTTERFLIES IN AN URBAN LANDSCAPE IN DELHI, INDIA by Rajesh Chaudhary128REDISCOVERY OF THE ASSAM FLASH BUTTERFLY RAPALA TARA (LEPIDOPTERA: LYCAENIDAE) FROM UTTARAKHAND, INDIA by Gaurav Joshi135INDIAN TREE FROG POLYPEDATES MACULATUS CAPTURING AND SWALLOWING A LIVE GECKO by Priyadarshini Supekar & Raju Kasambe136NEW LARVAL HOST PLANT OF TRYPANOPHORA SEMIHYALINA KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra138FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana141ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844	CHOCOLATE PANSY BUTTERFLY JUNONIA IPHITA (LEPIDOPTERA: NYMPHALIDAE)			
by Rajesh Chaudhary128REDISCOVERY OF THE ASSAM FLASH BUTTERFLY RAPALA TARA (LEPIDOPTERA: LYCAENIDAE) FROM UTTARAKHAND, INDIA by Gaurav Joshi135INDIAN TREE FROG POLYPEDATES MACULATUS CAPTURING AND SWALLOWING A LIVE GECKO by Priyadarshini Supekar & Raju Kasambe136NEW LARVAL HOST PLANT OF TRYPANOPHORA SEMIHYALINA KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra138FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana141ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844				
LYCAENIDAE) FROM UTTARAKHAND, INDIA by Gaurav Joshi135INDIAN TREE FROG POLYPEDATES MACULATUS CAPTURING AND SWALLOWING A LIVE GECKO by Priyadarshini Supekar & Raju Kasambe136NEW LARVAL HOST PLANT OF TRYPANOPHORA SEMIHYALINA KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra138FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana141ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844				
by Gaurav Joshi135INDIAN TREE FROG POLYPEDATES MACULATUS CAPTURING AND SWALLOWING A LIVE GECKO by Priyadarshini Supekar & Raju Kasambe136NEW LARVAL HOST PLANT OF TRYPANOPHORA SEMIHYALINA KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra138FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana141ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844				
LIVE GECKO by Priyadarshini Supekar & Raju Kasambe 136 NEW LARVAL HOST PLANT OF <i>TRYPANOPHORA SEMIHYALINA</i> KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra 138 FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (<i>STICHOPHTHALMA</i> <i>CAMADEVA</i>) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana 141 <i>ERANTHEMUM ROSEUM</i> (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY <i>KALLIMA HORSFIELDII</i> KOLLAR, 1844				
by Priyadarshini Supekar & Raju Kasambe136NEW LARVAL HOST PLANT OF TRYPANOPHORA SEMIHYALINA KOLLAR [1844] (INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra138FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana141ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844				
(INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL, INDIA by Arajush Payra138FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana141ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844				
FIRST REPORT OF THE NORTHERN JUNGLEQUEEN BUTTERFLY (STICHOPHTHALMA CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana 141 ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844	(INSECTA: LEPIDOPTERA: ZYGAENIDAE: CHALCOSINAE) FROM WEST BENGAL,			
CAMADEVA) FROM MIZORAM, INDIA by Lallawmsanga & R. Zoramchhuana 141 ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844	by Arajush Payra 138			
ERANTHEMUM ROSEUM (ACANTHACEAE): A NEW LARVAL HOST PLANT FOR THE SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844	CAMADEVA) FROM MIZORAM, INDIA			
SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844	by Lallawmsanga & R. Zoramchhuana 141			
	SOUTHERN BLUE OAKLEAF BUTTERFLY KALLIMA HORSFIELDII KOLLAR, 1844			

CONFIRMATION OF THE REDBREAST BUTTERFLY PAPILIO ALCMENOR (LEPIDOPTERA: PAPILIONIDAE) IN UTTARAKHAND, INDIA by Rajiv Butalia, Shankar Kumar & Ambica Agnihotri 146

TWO NEW BUTTERFLY SPECIES FOR NEPAL: *EUREMA ANDERSONI* (PIERIDAE) AND *LETHE DAKWANIA* (NYMPHALIDAE) by Piet van der Poel 148

THE DRAGONFLY *ATRATOTHEMIS REELSI* WILSON, 2005 IN NAMDAPHA TIGER RESERVE, NORTHEAST INDIA- AN ADDITION TO THE INDIAN ODONATA FAUNA by Minom Pertin, Roshan Upadhaya, Tajum Yomcha & Arajush Payra 153

FIRST RECORD OF LEECH'S SWIFT *CALTORIS BROMUS* LEECH, 1894 (INSECTA: LEPIDOPTERA: HESPERIIDAE: HESPERIINAE) FROM WEST BENGAL, INDIA by Rajib Dey 155

OVIPOSITION BY *JAMIDES BOCHUS* (STOLL, [1782]) (INSECTA: LEPIDOPTERA: LYCAENIDAE) IN NEW DELHI, INDIA by Rajesh Chaudhary & Vinesh Kumar 157

DISTRIBUTIONAL RANGE EXTENSION OF BANANA SKIPPER *ERIONOTA TORUS* (LEPIDOPTERA: HESPERIIDAE) TO THANE AND PALGHAR DISTRICTS OF MAHARASHTRA, INDIA WITH DISCUSSION ABOUT ITS HARMFUL EFFECTS ON LOCAL BANANA PLANTATIONS

by Sagar Sarang, Nilesh Chandorkar, Tejas Mehendale, Gaurav Khule, Abhinav Nair, Omkar Damle & Raju Kasambe 158

NECTAR RETRIEVAL BY INSECT SWARM DOES NOT RESULT IN POLLINATION OF LYONIA OVALIFOLIA FLOWERS IN THE KUMAON HIMALAYA, INDIA by Ambica Agnihotri 163

A COMPREHENSIVE CHECKLIST OF BUTTERFLIES SEEN IN CORBETT TIGER RESERVE, UTTARAKHAND, INDIA by Rajesh Chaudhary, Sanjay Chhimwal & Vinesh Kumar 167

THE ZEBRA SKIPPER BUTTERFLY *SPIALIA ZEBRA*: AN ADDITION TO THE BUTTERFLIES OF INDIA by Mukesh Panwar 187

CONFIRMATION OF THE ROSY FLASH BUTTERFLY *RAPALA ROSACEA* (LEPIDOPTERA: LYCAENIDAE) IN MIZORAM, INDIA by Lallawmsanga & Zothansangi 188

SOME NEW DISTRIBUTION RECORDS OF HESPERIID BUTTERFLIES IN NEPAL by Sajan K.C. 190

BUTTERFLIES OF GOVERNMENT NURSERY, BHATAGAON, CHHATTISGARH WITH TWO ADDITIONS TO THE STATE FAUNA by H N Tandan, Gulab Chand, Ravi Naidu & Swati Tandan 195

NEEM FLOWERS (AZADIRACHTA INDICA) AS AN ABUNDANT SOURCE OF NECTAR FOR BUTTERFLIES IN AN URBAN LANDSCAPE IN DELHI, INDIA RAJESH CHAUDHARY

Department of Biomedical Science, Acharya Narendra Dev College, Govindpuri, Kalkaji, New Delhi-19. rajeshchaudhary@andc.du.ac.in

Reviewer: Peter Smetacek

Abstract

Most butterflies feed on floral nectar. The ability of butterflies to access nectar deep within a flower depends on the length of their proboscis. Adequate nutrition is known to maintain the reproductive potential of butterflies. In an urban context, lacking adequate parks and gardens, there is always a need of flowers that can provide nectar to butterflies. In this situation, avenue trees, bearing flowers with nectar accessible to a wide range of butterflies, could help maintain a reasonably diverse butterfly population. The Neem tree, *Azadirachta indica*, is planted along roads and in parks in urban areas of Delhi. Its small flowers were found to attract several species of butterflies belonging to all five major families present in Delhi. It is suggested that trees such as *Azadirachta indica* and other nectar trees, if planted as avenue trees, may help in the conservation of butterflies in an urban landscape.

Key words: Flowering tree, Food plant, Butterfly, Urban Landscape

Introduction

Butterflies are liquid-feeding insects; they acquire food by sucking through their long tubular proboscis (Krenn, 2010). Adult butterflies can be broadly categorised into two feeding guilds: nectar feeding (feeding on floral nectar) and non-nectar feeding (acquiring nutrition from decaying fruit, sap, honey dew, etc.). The feeding habits are associated with certain modifications in the microstructure of the proboscis, particularly at the tip (Krenn et al., 2001, Molleman et al., 2005; Krenn, 2010; Lehnert, et al., 2016). A vast majority of butterflies feed on floral nectar (Krenn, 2010). The profitability of feeding on floral nectar depends in part on the depth of the corolla-tube (or the depth at which nectar is seated in flowers); the amount of nectar, proboscis length and wing load (Corbet, 2000; Tiple et al., 2009). The shorter proboscis of small butterflies limits them from using flowers with deep seated nectar (May, 1992). Butterflies with a longer proboscis

however, can harvest nectar from a broad range of flowers, including flowers with short as well as those with long corolla tubes (May, 1992; Corbet, 2000; Kunte, 2007; Sultana et al., 2017). Nutrition is known to maintain high fecundity in female butterflies and increase their body weight and fat storage (Hill et al., 1989; O'Brien et al., 2004; Mevi-Schutz et al., 2005; Geister et al., 2008; Karlsson et al., 2009). Butterflies obtain nectar from a range of flowers. The role of tree flowers as a source of nectar has not been appreciated by many researchers. Tree flowers however, can be an important source of nectar for butterflies living in or close to forested as well as urban landscapes. Here, I present an account of butterfly species which can benefit from feeding on the flowers of Azadirachta indica (A. Juss; Family: Meliaceae) commonly known as 'Neem tree'. The tree commonly grows in urban and rural areas in most parts of India and a few researchers have indicated

BIONOTES

Neem flowers as a source of nectar for butterflies (Palot et. al. 2005, Vikas, 2011). The present observations were made in urbanized parts of Delhi, where *A. indica* trees are scattered along roads and in gardens. The results have been discussed in the context of the role *A. indica* plays in supporting butterfly populations in urban areas.

Material and Methods

The observations were made on Azadirachta indica growing as avenue trees in the residential area of Rohini in North-West Delhi. Three trees were observed to assess the period and duration of flowering. To determine the number of species of butterflies visiting the tree, the crown of one of the trees was observed from the fourth floor balcony (at a height of approximately 10 m) of a residential building. Observations began soon after flowers appeared on most of the branches (3rd week of April, 2020) and continued until senescence of flowers on most of the twigs and appearance of fruits (3rd week of May, 2020). The tree was observed for 25 days. On any given day, the first observation was made between 10:00 am and 10:30 am, the second between 12:00 pm and 12:15 pm and the third and last between 3:00 pm and 3:30 pm. During each of the three events the tree was observed for 10 minutes. During this time (i.e. 10:00 am to 4:00 pm) the entire tree crown was illuminated by sunlight. The decision regarding at which time of the day observations should be made was based on two davs of trial observations before the actual study was started. During the trial the tree was observed for 10 minutes for every 1-1.5 hours between 9:00 am and 4:00 pm. It was found that the maximum butterfly activity on the canopy was concentrated between 10:00 am and 1:00 pm followed by a dip between 1:00 pm and 3:00 pm, possibly due to high temperature. A slight rise in activity was again seen from 3:00 pm to 4:30 pm. Butterflies were identified from a distance of 2-3 meter. Smaller butterflies such as Lycaenids or those

landing far from the location of the observer were photographed using Digital SLR camera (Nikon) fitted with an 80-400 mm zoom telephoto lens. Identification of butterflies up to species level was done based on Kehimkar (2016) and Smetacek (2016).

Results and Discussion

A. indica has various beneficial properties and therefore, it has been grown in India for ages (Kumar et al., 2013). It has been planted along roads and in parks in Delhi. In this part of India, the peak blooming period of A. indica is during the months of April and May (Kumar et al., 1999; Vikas, 2011) and the same has been observed in the present study as well. A tree in full bloom is laden with white or pale yellow flowers (about 8-11 mm wide and 6-5 mm long) arranged in drooping panicles clustered at the end of twigs (Figures 1 & 2). The flowers emit a sweet fragrance which probably helps attracting visitors or pollinators. The peak time of visitation was observed to be between 10:00 am and 12:00 noon. This has also been reported in a previous study undertaken on reproductive biology of A. indica (Vikas, 2011). A total of 24 species of butterflies belonging to 22 genera of five Pieridae. Papilionidae. families (viz. Lycaenidae, Nymphalidae and Hesperiidae) were observed feeding on the flowers of A. indica (Table 1 & Figure 3). Three species were only identified to genus level. Of all the butterfly species visiting A. indica flowers (Table 1), individuals of Belenois aurota were most numerous. B. aurota is a migratory butterfly which is abundant in Delhi from March till early May (Larsen, 2002). Those species which were observed only once during the entire period of observation (Table 1) are extremely rare in Delhi (such as Delias eucharis); or not commonly sighted in the study area (such as Acraea violae. Ixias pyrene and *Colotis amata*). However, some butterflies commonly sighted in the area during the period of study, such as Papilio demoleus and Ariadne merione, rarely visited A. indica

flowers. This may indicate some level of preference of different species butterflies for A. indica flowers. It is evident from Table 1, that nectar present in flowers of A. indica is accessible to both butterflies with longer as well as shorter proboscis. The flowers were observed to be foraged upon by some of the smallest butterflies of Delhi such as Zizeeria sp., Zizula hylax and Luthrodes pandava with proboscis length as small as 4.4 mm (Tiple et al., 2009). It therefore appears that all the butterfly species of Delhi possess a suitable length of proboscis for probing Neem flowers for nectar. Further, though a single flower only contains a small amount of nectar, clustering of flowers makes foraging advantageous even to larger numbers of butterflies (Vikas, 2011; Corbet, 2000).

Flowers of trees planted along roads are a source of nectar for butterflies in urban areas jam-packed with buildings with little or no space left for gardens and parks. In this setting, flowering trees can be important refuelling stations for migrating butterflies flying several meters above the ground to avoid vehicular disturbance and other obstructions at ground level. Blooming of A. indica coincides with the period of the year when butterflies are abundant in Delhi. Further, the tree retains flowers for over one month providing food to a wide range of butterflies. Thus, trees such as A. indica and other flowering trees with a range of different flower types, especially those known to attract butterflies and flowering in the main butterfly flying and migrating periods, can play an important role in maintaining butterfly populations in urban landscapes.

Acknowledgement

The author is grateful to Yash Mangla of A.N.D.C. for discussions regarding floral anatomy and pollination ecology. The author is also grateful to the reviewer for valuable comments that helped improve the manuscript.

BIONOTES

References

Corbet, S.A. 2000. Butterfly nectaring flowers: butterfly morphology and flower form. *Entomol. Exp. Appl.* 96: 289–298.

Geister, T. L., M.W. Lorenz, K. H. Hoffmann & K. Fischer. 2008. Adult nutrition and butterfly fitness: effects of diet quality on reproductive output, egg composition, and egg hatching success. *Frontiers in Zoology*, Doi:10.1186/1742-9994-5-10.

Hill, C.J. & N.E. Pierce. 1989. The effect of adult diet on the biology of butterflies 1. The Common Imperial Blue, *Jalmenus evagoras*. *Oecologia*, 81: 249-257.

Karlsson, B. & H. Van Dyck. 2009. Evolutionary ecology of butterfly fecundity. In *Ecology of Butterflies in Europe*, eds. J. Settele, T. Shreeve, M. Konvička and H. Van Dyck. Cambridge University Press, ISBN: 9780521747592, 189-197.

Kehimkar, I. 2016. *Butterflies of India*. Bombay Natural History Society, Mumbai. xii + 505 pp.

Krenn, H.W., K. P. Zulka & T. Gatschnegg. 2001. Proboscis morphology and food preferences in nymphalid butterflies (Lepidoptera: Nymphalidae). *Journal of Zoology* 254: 17–26.

Krenn, H.W. 2010. Feeding Mechanisms of Adult Lepidoptera: Structure, Function, and Evolution of the Mouthparts. *Annual Review of Entomology* 55: 307–327, doi:10.1146/annurev-ento-112408-085338.

Kumar, V. S. K. & M. L. Arrawatia. 1999. Leafing, flowering and fruiting of *Azadirachta indica* (Neem) in India. *Journal of Tropical Forest Science*, 11: 723-730.

Kumar, V.S. & V. Navaratnam. 2013. Neem (*Azadirachta indica*): Prehistory to contemporary medicinal uses to humankind. *Asian Pacific Journal of Tropical Biomedicine* 3: 505–514.

Vol. 22 (3), September, 2020

Kunte, K. 2007. Allometry and functional constraints on proboscis lengths in butterflies. Functional Ecology 21: 982-987.

Larsen, T.B. 2002. The butterflies of Delhi, India – an annotated check-list. Esperiana 9: 459-479.

Lehnert, M.S., C.E. Beard, P.D. Gerard, K.G. Kornev & P.H. Adler. 2016. Structure of the Lepidopteran Proboscis in Relation to Feeding Guild. Journal of Morphology 277: 167-82. doi: 10.1002/jmor.20487.

May, P.G. 1992. Flower selection and the dynamics of lipid reserves in two nectarivorous butterflies. Ecology 73: 2181–2191.

Mevi-Schutz, J. & A. Erhardt. 2005. Amino Acids in Nectar Enhance Butterfly Fecundity: A Long-Awaited Link. The American Naturalist 165: 411-419.

Molleman, F., H. Krenn, M. E. van Alphen, P.M. Brakefield, P. J. Devries & B.J. Zwaan. 2005. Food intake of fruitfeeding butterflies: evidence for adaptive variation in proboscis morphology. Biological Journal of the Linnean Society 86: 333–343.

O'Brien, D.M., C.L. Boggs & M. L. Fogel. 2004. Making eggs from nectar: The role of life history and dietary carbon

BIONOTES

turnover in butterfly reproductive resource allocation. Oikos 105: 279-291.

Palot, M.J, & V.P Soniya. 2005. Butterfly flower interaction In Keoladeo National Park, Bharatpur, Rajasthan. Rec. zool. Surv. India, 104: 51-57.

Smetacek, P. 2016. A Naturalist's Guide to the Butterflies of India, Pakistan, Nepal, Bhutan, Bangladesh and Sri Lanka. Reprinted edition. John Beaufoy Publishing Ltd., Oxford. 176 pp.

Sultana, S., S. Rahman, S. Akand, M.F. Hoque, M.S. Miah & M.A. Bashar. 2017. Butterfly and their functional relations with the nectar plants in some selected forests. Journal of Biodiversity Conservation and Bioresource Management 3: 93-102.

Tiple, A.D., A.M. Kuhrad & R.L.H. Dennis. 2009. Adult butterfly feeding– nectar flower associations: constraints of taxonomic affiliation, butterfly, and nectar flower morphology. Journal of Natural History 43: 855–884.

Vikas & R. Tandon. 2011. Reproductive biology of Azadirachta indica (Meliaceae), a medicinal tree species from arid zones. Plant Species Biology 26: 116–123.

Table 1: Genera and species of butterflies visiting *Azadirachta indica* flowers. Symbol (#) represents butterfly species that visited flowers more often, and symbol (*) represents species of butterflies that were sighted only once on the flowers during the entire period of observation.

S.N.	Family	Species Recorded
1	Pieridae	Pioneer Belenois aurota (Fabricius, 1793) #
2		Catopsilia sp. (Huebner, 1819)
3		Large Cabbage White Pieris brassicae (Linnaeus, 1758)
5		Indian Cabbage White Pieris canidia (Linnaeus, 1768)
6		Common Gull Cepora nerissa (Fabricius, 1775)

Vo	l. 22 (3), Septemb	er, 2020 BIONOTES
7		Small Salmon Arab Colotis amata
		(Fabricius, 1775) *
8		Yellow Orange Tip Ixias pyrene (Linnaeus, 1764) *
9		Eurema sp. (Huebner, 1819)
10		Common Jezabel Delias eucharis (Drury, 1773) *
11	Papilionidae	Common Jay Graphium doson (C. & R. Felder, 1864) #
12		Lime Butterfly Papilio demoleus (Linnaeus, 1758) *
13	Lycaenidae	Plains Cupid Luthrodes pandava (Horsfield, 1829) #
14		Pea Blue Lampides boeticus (Linnaeus, 1767) #
15		Zebra Blue Leptotes plinius (Fabricius, 1793) #
16		Zizeeria Chapman, 1910 sp.
17		Tiny Grass Blue Zizula hylax (Fabricius, 1775)
18	Nymphalidae	Plain Tiger Danaus chrysippus (Linnaeus, 1758) #
19		Common Tiger Danaus genutia (Cramer, 1779)
20		Blue Tiger Tirumala limniace
		(Cramer, 1775)
21		Common Castor Ariadne merione (Cramer, 1777) *
22		Painted Lady Vanessa cardui (Linnaeus, 1758)
23		Tawny Coster Acraea violae (Fabricius, 1793) *
24		Blue Pansy Junonia orithya (Linnaeus, 1758)
25	Hesperiidae	Common Banded Awl Hasora chromus (Cramer, 1780)



Fig.1: Flowering branch of *Azadirachta indica* showing inflorescence.



Fig.2: Close-up of a single Azadirachta indica flower.

Vol. 22 (3), September, 2020

BIONOTES



Fig.3: Pieris canidia

Fig.4: Cepora nerissa

Fig.5: Belenois aurota



Fig.6: Pieris brassicae



Fig.7: Graphium doson



Fig.8: Lampides boeticus



Fig.9: Zizeeria sp



Fig.10: Luthrodes pandava



Fig.11: Leptotes plinius

Vol. 22 (3), September, 2020

BIONOTES



Fig.12: Zizula hylax



Fig.13: Vanessa cardui



Fig.14: Acraea violae



Fig.15: Danaus genutia



Fig.16: Danaus chrysippus