Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

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

SHORT COMMUNICATION

DIVERSITY OF TWO FAMILIES LIBELLULIDAE AND COENAGRIONIDAE (ODONATA) IN REGIONAL INSTITUTE OF EDUCATION CAMPUS, BHUBANESWAR, ODISHA, INDIA

Priyamvada Pandey & Animesh Kumar Mohapatra

26 February 2017 | Vol. 9| No. 2 | Pp. 9851–9857
10.11609/jott.2547.9.2.9851-9857

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 February 2017 | 9(2): 9851–9857

Diversity of two families Libellulidae and Coenagrionidae (Odonata) in Regional Institute of Education Campus, Bhubaneswar, Odisha, India

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

Priyamvada Pandey [1] & **Animesh Kumar Mohapatra** [2]

[1,2] Department of Life Science Education, Regional Institute of Education (NCERT), Bhubaneswar, Odisha 751004, India
[1] priyamwada.pandey@gmail.com, [2] akmncert@gmail.com (corresponding author)

Abstract: Libellulidae and Coenagrionidae are the most dominant families among dragonflies and damselflies. The present study deals with the diversity, occurrence and present status of libellulids and coenagrionids within the Regional Institute of Education Campus in Bhubaneswar, Odisha, India (RIEC). The major objectives of this study are to prepare a preliminary checklist of libellulids and coenagrionids species in the RIEC and to find out the status and distribution of genera and species in their respective families. This study is also aimed at systematic planning for developing different strategies for conservation of odonates in the campus. During this study a total of 24 species have been recorded out of which 20 species belong to the family Libellulidae representing 15 genera and four species belong to the family Coenagrionidae representing four genera. The findings of this study are based on the survey which was carried out for a period of four months in 2015.

Keywords: Anisoptera, Bhubaneswar, Coenagrionidae, Libellulidae, Odonata, Regional Institute of Education Campus, Zygoptera.

Odonates represent one of the primitive orders of insects having their evolutionary origin about 220 million years ago in the carboniferous period (Mitra 2006). There are approximately 6000 species belonging to 630 genera and 28 families which have been reported worldwide out of which only one species are included under Schedule I of the Wildlife Protection Act, 1972 (Tsuda 1991; Silsby 2001; Rathod et al. 2012). Dragonflies belong to the suborder Anisoptera and are characterized by their unequally-sized wings and a stouter abdomen. Damselflies are included under the sub-order Zygoptera having a more slender body with both wings approximately of similar size and shape (McGavin et al. 2002). Libellulidae and Coenagrionidae are the largest, successful and the most heterogenous family among dragonflies and damselflies including about 1,000 species all over the world (Richards et al. 1977). Odonates remain closely associated to standing water bodies like reservoirs, lakes, ponds, even seasonal rain water puddles are preferred by several species while some prefer running water like rivers, rivulets, hill streams, etc. (Bora & Meitei 2014). Several reports convey that the distributions of Odonates are dependent on the nature of water habitat and temperature, i.e., they choose specific environments for their survival (Rehn 2003; Vincent et al. 2008). In India, 470 species of odonates are recorded representing 139 genera and 19 families out of which 95 species belong to the family Libellulidae and 65 species belong to the family Coenagrionidae (Prasad & Varshney 1995; Subramanian 2009). In the peninsular region, 50 species of libellulids and 25 species of coenagrionids were

DOI: http://doi.org/10.11609/jott.2547.9.2.9851-9857 | **ZooBank:** urn:lsid:zoobank.org:pub:49414531-F862-450F-A804-31A6B8B317DE

Editor: Robin Wen Jiang Ngiam, National Parks Board, Singapore. **Date of publication:** 26 February 2017 (online & print)

Manuscript details: Ms # 2547 | Received 25 September 2016 | Final received 26 November 2016 | Finally accepted 22 December 2016

Citation: Pandey, P. & A.K. Mohapatra (2017). Diversity of two families Libellulidae and Coenagrionidae (Odonata) in Regional Institute of Education Campus, Bhubaneswar, Odisha, India. *Journal of Threatened Taxa* 9(2): 9851–9857; http://doi.org/10.11609/jott.2547.9.2.9851-9857

Funding: Department of Life Science Education, Regional Institute of Education (NCERT), Bhubaneswar, Odisha.

Competing interests: The authors declare no competing interests.

Acknowledgements: The authors are grateful to Dr. Lala A. K. Singh, Former Research Officer, Odisha and Dr. Siba Prasad Parida, Scientist, RMNH, Bhubaneswar, Odisha for their valuable guidance.

recorded (Gunathilagaraj et al. 1999; Kandibane et al. 2005; Arulprakash & Gunathilagaraj et al. 2010). Nair (2011) described 45 species of libellulids and 25 species of coenagrionids in Odisha and eastern India.

Study Area

The Regional Institute of Education (RIE), Bhubaneswar is located in the middle of the city at 20°17'20"N & 85°49'57"E, altitude, 45m, covering an area of approximately 40.7ha, having a perimeter of 2.65km. The study area has dense vegetation and provides a favourable habitat for a varied diversity of libellulids and coenagrionids. It experiences tropical weather conditions with an average temperature ranging between 20°C and 36°C. The summer season extends from March to May having maximum temperatures often exceeding 40°C, followed by monsoon season from June to October with a temperature range of 25–32 °C. Winter lasts for about 10 weeks from November to February with a temperature range of 15–18 °C. May is the hottest month with daily temperatures ranging from 32–42 °C. December is the coldest month, with temperatures varying from 15–28 °C. The area receives an average annual rainfall of 1,492mm (58.73 in).

Materials and Methods

The present study was done over a period of four months from Au gust to November 2015. Surveys were carried out throughout the morning, noon and evening hours to record maximum species of libellulids and coenagrionids. Maximum numbers of species were recorded during afternoon hours from early August to late September. Observations were made with the aid of a binocular and photographs were taken in their natural habitat with the help of digital cameras (Nikon L100 and Olympus E-420).

Identification: The species were identified, and classified with the help of identification keys provided by Fraser (1933, 1934, 1936), Subramanian (2005), Mitra (2006), Bedjaniè et al. (2007), Andrew et al. (2009) and Nair (2011). The total number of genera and species were listed and identified species were classified into three categories according to their occurrence and monthly visibility within the study area: C - common (10–30 sightings), O - occasional (5–10 sightings), R - rare (2–5 sightings).

Results

In the present findings, 20 (83.33%) species of dragonflies representing 15 (78.95%) genera belonging to the family Libellulidae and four (16.67%) species of damselflies representing four genera (21.05%) belonging to the family Coenagrionidae have been reported (Tables 1 and 2). The photographs of the recorded species are presented as Images 1–31. Most of the recorded libellulids were found near the fish pond area in the campus. Coenagrionids have been reported in the grasses and swampy areas. Members of the Libellulidae family are small to medium-sized, brightly coloured, often having wing patches and they breed mainly in still water. One of the unique features of libellulids is that they frequently return to and defend the same perch or marsh edge. Coenagrionids are identified from their transparent wings which are rounded at tips and they have a long thin abdomen. They are non-metallic and found in almost all colours from blue to orange.

Figure 1. Satellite overview map of study area, Google map 2015

Discussion

Subramanian (2009) in his study described a total of 11 dragonfly families at the global level, out of which the maximum belong to two major families: Libellulidae (972 species) and Gomphidae (958 species), followed by Aeshnidae (436 species), Corduliidae (249 species) and Macromiidae (123 species). Sharma & Shukla (2015) recorded 25 species of Odonata. It includes 15 species of dragonflies belonging to three families and 10 species of damselflies under four families. Similar Libellulidae family dominance has also been reported by Manwar et al. (2012) and Tijare & Patil (2012) while studying dragonflies and damselflies in Maharashtra and Nagpur, respectively. The present study showed that the Libellulidae family is the most diverse and dominant family of dragonflies in the study area. Among all 20 species of libellulids recorded, nine (45%) are common,

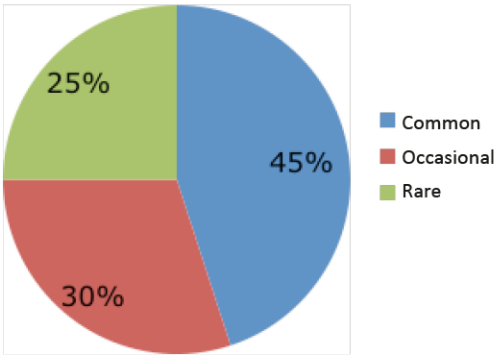

Figure 2. Percentile distribution showing status of libellulid species recorded in RIE campus, Bhubaneswar

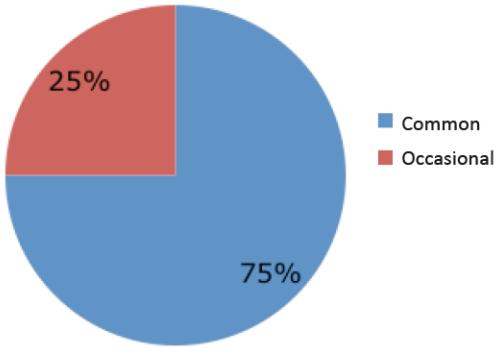

Figure 3. Percentile distribution showing status of coenagrionid species recorded in RIE campus, Bhubaneswar

Table 1 . Species of the family Libellulidae (Anisoptera) recorded in RIE campus with status.

Family/ Genus	Scientific name	Common name Nair (2011)	Monthly visibility (Aug–Nov)	Status	IUCN Red List status
Libellulidae (15 genera, 20 species)					
Acisoma	*Acisoma panorpoides* (Rambur,1842)	Trumpet Tail	A,S,O,N	C	LC
Aethriamanta	*Aethriamanta brevipennis* (Rambur,1842)	Scarlet Marsh Hawk	A,S	O	LC
Brachydiplax	*Brachydiplax sobrina* (Rambur,1842)	Blue-tailed Marsh Skimmer	A,S,O,N	C	LC
Brachythemis	*Brachythemis contaminata* (Fabricius, 1793)	Ditch Jewel	A,S,O,N	C	LC
Bradinopyga	*Bradinopyga geminata* (Rambur,1842)	Granite Ghost	A,S,O,N	C	LC
Crocothemis	*Crocothemis servilia* (Drury, 1770)	Ruddy Marsh Skimmer	A,S,O,N	C	LC
Diplacodes	*Diplacodes trivialis* (Rambur, 1842)	Ground Skimmer	A,S,O,N	C	LC
Neurothemis	*Neurothemis intermedia* (Rambur, 1842)	Ruddy Meadow Skimmer	A,S	O	LC
	Neurothemis tullia (Drury, 1773)	Pied Paddy Skimmer	A,S	O	LC
Orthetrum	*Orthetrum pruinosum* (Rambur,1842)	Crimson-tailed Marsh Hawk	S	R	LC
	Orthetrum glaucum (Brauer, 1865)	Blue Marsh Hawk	S	R	LC
	Orthetrum sabina (Drury, 1770)	Green Marsh Hawk	A,S,O,N	C	LC
	Orthetrum triangulare (Selys,1878)	Blue-tailed Forest Hawk	N	R	LC
	Orthetrum villosovittatum (Brauer, 1868)*	Fiery Skimmer*	S,O	O	LC
Palpopleura	*Palpopleura sexmaculata* (Fabricius, 1798)	Blue Tailed Yellow Skimmer	N	R	LC
Pantala	*Pantala flavescens* (Fabricius, 1787)	Wandering Glider	A,S,O,N	C	LC
Rhodothemis	*Rhodothemis rufa* (Rambur, 1842)	Rufous Marsh Glider	N	R	LC
Rhyothemis	*Rhyothemis variegata* (Linnaeus, 1763)	Common Picture Wing	S,O	O	LC
Tramea	*Tramea limbata* (Desjardins,1842)	Black Marsh Trotter	A,S	O	LC
Trithemis	*Trithemis pallidinervis* (Kirby, 1889)	Long-Legged Marsh Glider	A,S,O,N	C	LC

* - New report; C - common (10–30 sightings), O - occasional (5–10 sightings), R - rare (2–5 sightings).

six (30%) are occasional and five (25%) are rare (Table 3; Fig 2). Out of four species of coenagrionids observed, three (75%) are common and one (25%) are occasional (Table 3; Fig 3). It was also noted that the maximum number of species were recorded in the month of August and September, except nine species of libellulids and three species of coenagrionids which were present in all four months. Single species were recorded from the genera *Acisoma, Aethriamanta, Brachydiplax, Brachythemis, Bradinopyga, Crocothemis, Diplacodes, Palpopleura, Pantala, Rhodothemis, Rhyothemis, Tramea* and *Trithemis* constituting 13 species. There were two species which were recorded under the genus *Neurothemis* (*intermedia* and *tullia*) and five species

Table 2. Species of the family Coenagrionidae (Zygoptera) recorded in RIE campus with status.

Family/Genus	Scientific name	Common name	Monthly visibility (Aug–Nov)	Status	IUCN Red List status
Coenagrionidae (4 genera, 4 species)					
Agriocnemis	*Agriocnemis pygmaea* (Rambur, 1842)	Pigmy Dartlet	A,S,O,N	C	LC
Ceriagrion	*Ceriagrion coromandelianum* (Fabricius,1798)	Coromandel Marsh Dart	A,S,O,N	C	LC
Enallagma	*Enallagma parvum* (Selys,1876)	Azure Dartlet	S,O	O	LC
Ischnura	*Ischnura aurora* (Brauer,1865)	Golden Dartlet	A,S,O,N	C	LC

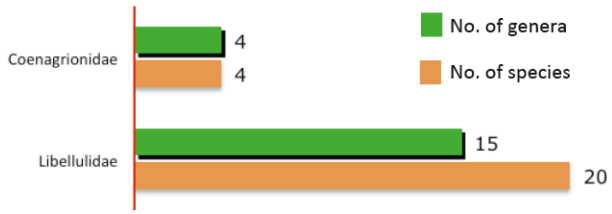

Figure 4. Distribution of genera and species of libellulids and coenagrionids in RIE campus, Bhubaneswar

reported belong to genus *Orthetrum* (*pruinosum, glaucum, Sabina, triangulare* and *villosovittatum*) (Table 1; Images 1–31). To obtain a more comprehensive understanding of Odonata diversity in the campus and any temporal changes in the area under the study should be continuously surveyed for at least two to three years.

References

Andrew, R.J., K.A. Subramanian & A.D. Tiple (2009). *A Handbook on Common Odonates of Central India.* South Asian Council of Odonatology, 65pp.

Arulprakash, R. & K. Gunathilagaraj (2010). Abundance and diversity of Odonata in temporary water bodies of Coimbatore and Salem districts in Tamil Nadu. *Journal of Threatened Taxa* 2(8): 1099–1102; http://doi.org/10.11609/JoTT.o2035.1099-102

Bedjaniè, M., K. Conniff & G. de Silva Wijeyeratn (2007). *Gehan's Photo Guide: A Photographic Guide to the Dragonflies of Sri Lanka.* Jetwing Eco Holidays.

Bora, A. & L.R. Meitei (2014). Odonates (Dragonflies and Damselflies) of Indian Council of Agricultural Research (ICAR), research complex for NEH Region Campus, Umiam, Meghalaya, India. *Journal of Entomology and Zoology Studies* 2(6): 16–21.

Fraser, F.C. (1933). *Fauna of British India - Odonata 1.* Taylor and Francis Ltd. London, 423pp.

Fraser, F.C. (1934). *Fauna of British India - Odonata 2.* Taylor and Francis Ltd. London, 398pp.

Fraser, F.C. (1936). *Fauna of British India - Odonata 3.* Taylor and Francis Ltd. London, 461pp.

Gunathilagaraj, K., R.P. Soundarajan, N. Chitra & M. Swamiappan (1999). Odonata in the rice fields of Coimbatore. *Zoos' Print Journal* XIV(6): 43–44.

Kandibane, M., S. Raguraman & N. Ganapathy (2005). Relative abundance and diversity of Odonata in an irrigated rice field of Madurai, Tamil Nadu. *Zoos' Print Journal* 20(11): 2051–2052.

Manwar, N.A., P.P. Rathod & I.A. Raja (2012). Diversity & abundance of dragonflies and damselflies of Chatri Lake Region, in Pohara-Malkhed Reserve Forest, Amravati, Maharashtra (India). *International Journal of Engineering Research and Applications* 2(5): 521–523.

McGavin, G.C., L.N. Sorkin & S. Gorton (2002). *Smithsonian Handbooks Insects: Spiders and Other Terrestrial Arthropods*. American Museum of Natural History, New York. Published by Dorling Kindersley.

Mitra,T.R. (2006). *Handbook on - Common Indian Dragonflies (Insecta Odonata)*. Published by the Director, Zoological Survey of India, Kolkata, 124pp.

Nair, M.V. (2011). *Dragonflies & Damselflies of Orissa and Eastern India*. Wildlife Organisation, Forest & Environment Department, Government of Orissa,India.

Nikula, B. & J. Sones (2002). *Stokes Beginner's Guide to Dragonflies and Damselflies* - 1st Edition. Little, Brown and Company, Boston, New York.

Prasad, M. & R.K. Varshney (1995). A check list of Odonata of India including data on larval studies. *Oriental Insects* 29: 385–428.

Rathod, P.P., N.A. Manwar, S.S. Pawar & I.A. Raja (2012). Diversity and Abundance of Dragonflies and Damselflies (Order Odonata) in Agro Ecosystems around the Amravati City (M.S.), India in Mansoon Season. *International Journal of Agriculture Innovations and Research* 3(1): 174–182.

Rehn, A.C. (2003). Phylogenetic analysis of higher-level relationships of Odonata. *Journal of Systematic Entomology* 28: 181–239.

Richards, O.W. & R.G. Davies (1977). *Imms' General Textbook of Entymology: Classification and Biology* 10(2): 494–515.

Sharma, S. & A. Shukla (2015). Preliminary study of Odonates in south-east region of Narmada Valley, Jabalpur (MP). *International Journal of Recent Scientific Research* 6(10): 7038–7040.

Silsby, J. (2001). *Dragonflies of the World*. Natural History Museum in association with CSIRO Publishing, UK.

Subramanian, K.A. (2005). Dragonflies and Damselflies of Peninsular India-A Field Guide. E-Book of Project Lifescape. Centre for Ecological Sciences, Indian Institute of Science and Indian Academy of Sciences, Bangalore, India.

Subramanian, K.A. (2009). *A Checklist of Odonata of India*. Zoological Survey of India, 36pp.

Tijare, R.V. & K.G. Patil (2012). Diversity of Odonates in & around Gorewada National Park, Nagpur MS. (India). *Bionano Frontier* Special Issue, 9: 182-183.

Tsuda, S. (1991). *A Distributional List of World Odonata*. Osaka, 362pp.

Vincent, J., V.C. Kalkman, B. Klaas-Douwe, A.G.O. Dijkstra & R.P.J.T. Dennis (2008). Global diversity of dragonflies (Odonata) in freshwater. *Journal of Hydrobiologia* 595: 351–363.

Image 1. *Acisoma panorpoides* (Trumpet Tail) Female

Image 2. *Aethriamanta brevipennis* (Scarlet Marsh Hawk) Female

Image 3. *Brachydiplax sobrina* (Blue Tailed Marsh Skimmer) Female

Image 4. *Brachythemis contaminata* (Ditch Jewel) Male

Image 5. *Bradinopyga geminata* (Granite Ghost) Female

Image 6. *Crocothemis servilia* (Ruddy Marsh Skimmer) Male

Image 7. *Crocothemis servilia* (Ruddy Marsh Skimmer) Female

Image 8. *Diplacodes trivalis* (Ground skimmer) Male

Image 9. *Diplacodes trivialis* (Ground skimmer) Female

Image 10. *Neurothemis intermedia* (Ruddy Meadow Skimmer) Male

Image 11. *Neurothemis tullia* (Pied Paddy Skimmer) Male

Image 12. *Orthetrum pruinosum* (Crimson Tailed Marsh Hawk) Male

Image 13. *Orthetrum glaucum* (Blue Marsh Hawk) Male

Image 14. *Orthetrum sabina* (Green Marsh Hawk) Male

Image 15. *Orthetrum sabina* (Green Marsh Hawk) Female

Image 16. *Orthetrum triangulare* (Blue Tailed Forest Hawk) Male

Image 17. *Orthetrum villosovittatum* (Fiery Skimmer) Female

Image 18. *Palpopleura sexmaculata* (Blue Tailed Yellow Skimmer) Male

Image 19. *Pantala flavescens* (Wandering Glider) Male

Image 20. *Rhodothemis rufa* (Rufous Marsh Glider) Male

Image 21. *Rhyothemis variegata* (Common Picture Wing) Male

Image 22. *Rhyothemis variegata* (Common Picture Wing) Female

Image 23. *Tramea limbata* (Black Marsh Trotter) Male

Image 24. *Trithemis pallidinervis* (Long-Legged Marsh Glider) Female

Image 25. *Agriocnemis pygmaea* (Pigmy Dartlet) Male

Image 26. *Agriocnemis pygmaeae* (Pigmy Dartlet) Female

Image 27. *Ceriagrion coromandelianum* (Coromandel Marsh Dart) Male

Image 28. *Ceriagrion coromandelianum* (Coromandel Marsh Dart) Female

Image 29. *Enallagma parvum* (Azure Dartlet) Male

Image 30. *Ischnura aurora* (Golden Dartlet) Male

Image 31. *Ischnura aurora* (Golden Dartlet) Female

Journal of Threatened Taxa

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

February 2017 | Vol. 9 | No. 2 | Pages: 9777–9884
Date of Publication: 26 February 2017 (Online & Print)
DOI: 10.11609/jott.2017.9.2.9777-9884
www.threatenedtaxa.org

Article

Flora richness as an indicator of desert habitat quality in Kuwait
-- Yahya Al-Shehabi & Kevin Murphy, Pp. 9777–9785

Communications

Distribution of *Cryptopotamon anacoluthon* (Kemp, 1918) (Crustacea: Brachyura: Potamidae), a freshwater crab endemic to Hong Kong
-- David John Stanton, Michael Robertson Leven & Tommy Chung Hong Hui, Pp. 9786–9794

Moths of the family Limacodidae Duponchel, 1845 (Lepidoptera: Zygaenoidea) from Bhutan with six new generic and 12 new species records
-- Jatishwor Singh Irungbam, Meenakshi Singh Chib & Alexey V. Solovyev, Pp. 9795–9813

Odonates of Coimbatore District, Tamil Nadu, India
-- M. Suhirtha Muhil & P. Pramod, Pp. 9814–9828

Twenty-three new records of mantodea (Insecta) from some states of India
-- Tushar Kanti Mukherjee, Geetha Iyer & Parbati Chatterjee, Pp. 9829–9839

Short Communications

On the feeding habit of the Guiana Dolphin *Sotalia guianensis* (van Bénedèn, 1864) (Mammalia: Cetartiodactyla: Delphinidae) in southeastern Brazil (~220S): has there been any change in more than two decades?
-- Ana Paula Madeira Di Beneditto, Clara da Cruz Vidart Badia & Salvatore Siciliano, Pp. 9840–9843

Additions to the scorpion fauna (Arachnida: Scorpiones) of Kerala, India, with an illustrated key to the genera
-- K. Aswathi & P.M. Sureshan, Pp. 9844–9850

Diversity of two families Libellulidae and Coenagrionidae (Odonata) in Regional Institute of Education Campus, Bhubaneswar, Odisha, India
-- Priyamvada Pandey & Animesh Kumar Mohapatra, Pp. 9851–9857

A report on occurrence of aphidophagous predators of *Aphis odinae* (van der Goot) (Hemiptera: Aphididae) in cashew ecosystem from Goa, India
-- Ramasamy Maruthadurai & Narendra Pratap Singh, Pp. 9858–9861

Notes

A new critical habitat for conservation of the White-bellied Heron *Ardea insignis* Hume, 1878 (Aves: Ardeidae) from Bhutan
-- Karma Wangdi, Tashi Dhendup & Tsethup Tshering, Pp. 9862–9863

First report of the parasitoid wasp *Piestopleura* Förster (Hymenoptera: Platygastroidea: Platygastridae) from India
-- Kamalanathan Veenakumari, Peter Neerup Buhl, Anandhan Rameshkumar & Prashanth Mohanraj, Pp. 9864–9865

A century later the Manipur Argus *Callerebia suroia* Tytler, 1914 (Lepidoptera: Nymphalidae: Satyrinae) recorded in its type locality in Manipur, India
-- Jatishwor Singh Irungbam, Harmenn Huidrom & Baleshwor Singh Soibam, Pp. 9866–9869

First record of the predatory stinkbug *Eocanthecona concinna* (Walker, 1867) (Pentatomidae: Asopinae) from India
-- Sadashiv Hanumant Waghmare & Sunil Madhukar Gaikwad, Pp. 9870–9873

New records of Aplousobranch ascidians to Indian waters from Andaman Islands
-- Jhimli Mondal, C. Raghunathan & K. Venkataraman, Pp. 9874–9880

Additions to the flora of Coimbatore hills, Tamil Nadu, India
-- K. Kiruthika, M. Sulaiman & R. Gopalan, Pp. 9881–9884

zooh! ZÜRICH

WILD ZOO Threatened Taxa