

Periodic Research

Diversity of Dragonflies in the Victoria Park Reserved Forest, Bhavnagar, Gujarat, India



Ashish H. Shukla
Associate Professor & Head,
Deptt. of Zoology,
Sir P.P Institute of Science,
M.K Bhavnagar University,
Bhavnagar



Devendra Solanki
Teaching Assistant,
Deptt. of Zoology,
Sir P.P Institute of Science,
M.K Bhavnagar University,
Bhavnagar

P.P.Dodia
Associate Professor,
Deptt. of Zoology,
Sir P.P Institute of Science,
M.K Bhavnagar University,
Bhavnagar

Deven Mehta
Student,
Deptt. of Zoology,
M.S University Baroda,

Abstract

The diversity and ecological importance of insects makes them very valuable for studies of biodiversity. Dragonflies and Damselflies are the representatives of order Odonata. Odonates are an important amphibiotic invertebrate group depending on freshwater ecosystems for most of their life span. Victoria Park provides a good habitat for biodiversity of Dragonflies. Dragonfly variety in Victoria Park Reserve Forest was observed, where recorded a total of 17 species of Odonates. Libellulidae family is consisting of maximum number of genera and species followed by Aeshnidae, Gomphidae. Total 15 species of dragonflies are recorded belonging to 12 genera and 3 families. This is the first surveyed systematic record of dragonfly diversity in Victoria Park Reserve Forest, Bhavnagar District, Gujarat (21°44'48"N 72°7'54"E). Dragonfly observations on and recorded by transects once a week. Out of total dragonfly species examined, 9 (52.94%) are common and 8 (47.75%) are occasional the present study encourages the conservation of a wide range of dragonfly species in this area.

Keywords:Odonates, Dragonflies, Damselflies, Diversity, Reserved Forest
Introduction

Diversity is the variety of life on earth at all levels, from genes to worldwide populations of the same species; from communities of species sharing the same small area of habitat to worldwide ecosystems. Damselflies and dragonflies can be traced back to the Carboniferous and Permian periods of the Paleozoic Era (500-200 million years ago). However, modern families of these insects date from the upper Jurassic and Cretaceous periods (150-60 million years ago) (V. A. Shende, K. G. Patil 2013). Sils by (2001) described about 6000 species of dragonflies in all over the world. Dragonflies (suborder- *Anisoptera*) and damselflies (suborder-*Zygoptera*) are among the most attractive creatures on earth belonging to the most popular insect order- Odonata. These are observed near the ponds, lakes, rivers, ditches and all over the marshy places. Dragonflies have broad head with confluent separated eyes. Wings are dissimilar; hind wings are broadly dilated at base and differ in venation from fore-limbs. Adult Odonata possess two pairs of equal (damselflies) or sub equal (dragonflies) wings. The wing veins of Odonata are fused at their bases and the wings cannot be folded over the body at rest. The abdomen is long, flexible, with 10 visible segments, and terminates in clasping organs in both sexes.

Dragonfly families carry a prominent ovipositor under abdominal segments 9-10. Males always possess secondary genitalia on the underside of abdominal segments 2-3. The present study is the first of its kind carried out during March 2013 to November 2014.

Aim of Study

The area selected for the monitoring Odonates was Victoria Park (21°44'48"N 72°7'54"E) Reserved Forest, situated in Bhavnagar city near Jewells circle. Victoria Park covers 400 acres of land where important species of flora and fauna exist. Victoria Park is only urban reserve forest of the Gujarat state. It is a reserved forest that is considered to be a semi-arid zone with Moderate hot summers and cold winters. Average rainfall of this area is about 600mm and average temperature of this area is about 20.96 °C to 33.07 °C. Dragonflies are chosen as a tool to check the ecosystem because they are bio indicators of the healthy aquatic ecosystems. The dragonfly's lightpatterns have created huge interest among biologist as well as aerodynamic engineers. Dragonflies are also been nicknamed 'Helicopters' because of their hovering ability. Hence, this

study is a preliminary assessment of diversity of the dragonfly communities and further warrants detailed research in this particular area to serve as a milestone for the conservation of the wetlands and their insect communities ultimately.

Method for Sampling

The survey of dragonfly has been done for a period of a year from March 2013 to February 2014. The study has been carried out during Sunday and holidays in such a way that there should be at least one visit in each line transect in a week. Observations are made through walking transects of 0.6 km to 1 km length with 2 m to 5 m on either side with digital camera (Fig.3). The present study is based on 3 line transects to study the dragonfly population. The sites are visited in morning, noon and evening hours to note maximum possible species of dragonflies and damselflies. The recorded species of Victoria Park (Fig. 1) are identified with the help of photographs by using reference books and publications. Frequently seen dragonfly species are categorized as common (C) and species not found frequently are categorized as occasional (O) in status. (Table.1).

Results and Discussion

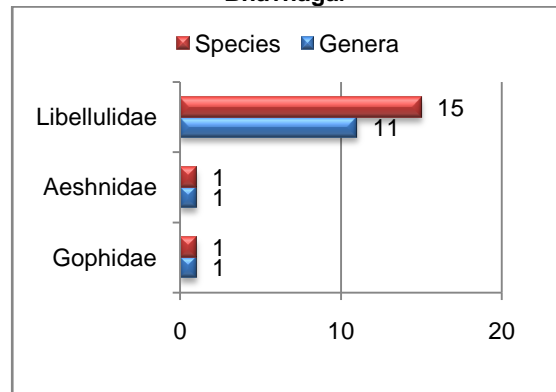
Total 17 species of Dragonflies were recorded from the Victoria Park. All these 17 species are the first record of the same reserve forest. Krishnakunj Lake of the park receives seepage water from nearby Bortalav. Abundant habitat is available for this creature in this reserved forest. This record covers the order anisoptera, with an emphasis on rare and vulnerable, habitat-dependent species. Selected species are discussed here. Like Dragonflies most insects, are seasonal flyers. Many species appear for a relatively short (3-10 weeks) time Mosquitoes and black flies are important food sources for adult dragonflies. Loss of habitat is probably the most serious threat to dragonflies. Preservation of Odonate habitat and management for high resource quality for these insects provides benefits beyond the conservation of damselflies and dragonflies. These effective insect predators can biologically control numbers of insects like mosquitoes significantly, obviating the need for chemical controls, the nymphs by eating the aquatic immature stages of mosquitoes and other pests, and the adults devouring the mature, winged mosquitoes in the air. Much more elaborated study is required to access the biodiversity of this unique beautiful creature.

Table-1 Checklist of Anisoptera species of Victoria Park, Bhavnagar

No.	Species	Common Name	Status
Family: Gomphidae (Species- 01)			
1	<i>Ictinogomphus rapax</i>	Common Clubtail	C
Family: Aeshnidae (Species-01)			
2	<i>Anax Parthenope</i>	Blue-Tailed Brown Darner	O
3	<i>Acisoma panorpoides</i>	Trumpet Tail	O
4	<i>Brachythemis contaminata</i>	Ditch Jewel	C
5	<i>Bradinopyga</i>	Granite Ghost	O

No.	Species	Common Name	Status
6	<i>Crocothemis servilla</i>	Ruddy Marsh Skimmer	C
7	<i>Diplacodes trivialis</i>	Ground Skimmer	O
8	<i>Orthetrum glaucum</i>	Blue Marsh Hawk	O
9	<i>Orthetrum Sabina</i>	Green Marsh Hawk	C
10	<i>Pantala flavescens</i>	Wandering Glider	O
11	<i>Rhyothemis variegata</i>	Common Picture Wing	C
12	<i>Tramea limbata</i>	Black Marsh Trotter	O
13	<i>Trithemis aurora</i>	Crimson Marsh Skimmer	O
14	<i>Trithemis festiva</i>	Black Stream Glider	C
15	<i>Trithemis pallidinervis</i>	Long-Legged Marsh Skimmer	C
16	<i>Brachydiplax Sobraia</i>	Blue Tailed Black Skimmer	O
17	<i>Orthetrum triangulare</i>	Blue Tailed Forest Hawk	O

Table 2 Status of Dragonflies of Victoria Park, Bhavnagar



Conclusion

Dragonflies are a good key to the health of the environment. Presence or absence of certain dragonfly species indicates the state of health of wetland. These species will breed only if all conditions of vegetation and water quality are met. If there is pollution or reduction in aquatic vegetation, this species are no longer seen. Although Victoria Park Reserve forest has a favorable habitat for Odonates, Forest Management is good at park but the gradual increase of human pressure in and around water bodies has an adverse effect on the sustainability of these insects. Therefore, protection measures are necessary for these valuable creatures.

References

- Andrew, R.J., Subramaniam, K. A. & Tiple, A. D. (2008) Common Odonates of Central India; E-book for "The 18th International Symposium of Odonatology", Hislop College, Nagpur, India
- Meenakshi Venkataraman (2010), Simova education & research, A Unit of K.R.S Pvt. Ltd, Karnataka 577 132

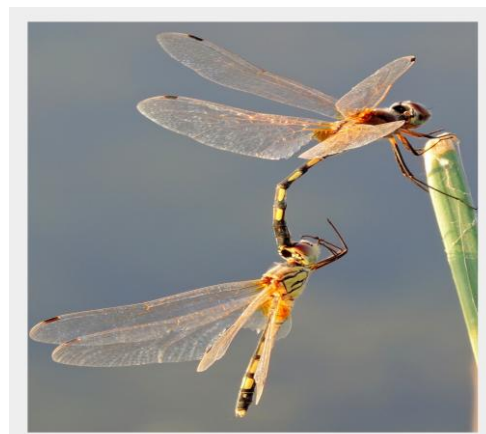
Periodic Research

3. Pushparaj Karthika and Natraj Krishnaveni ;Impact assessment of dragonfly diversity in different wetland ecosystems in coimbatore with special reference to abiotic factors International Journal of Advanced Research (2014), Volume 2, Issue 2, 639-648
4. V. A. Shende¹, K. G. Patil; Diversity of dragonflies (Anisoptera) in Gorewada International Bio-Park, Nagpur, Central India; Arthropods, 2013, 2(4): 200-207
5. Gaurab Jyoti Kalita, Bitupan Boruah and Gaurab Nandi Das; An observation on odonata (damselflies and dragonflies) fauna of Manchabandha reserve forest, Baripada, Odisha; Advances in Applied Science Research, 2014, 5(1):77-83
6. Insect Biodiversity: Science and Society Edited by Robert G. Foottit and Peter H.; Adler ©2009 Blackwell Publishing Ltd. ISBN: 978-1-405-15142-9
7. Melissa Sanchez-Herrera and Jessica L. Ware; Biogeography of Dragonflies and Damselflies: Highly Mobile Predators; Department of Biology, Rutgers the State University of New Jersey, Newark Campus, USA
8. Joãõ A Anderson Fulan., Rui Raimundo, Diogo Figueiredo and Manuela Correia; Abundance and diversity of dragonflies four years after the construction of a reservoir; Limnetica, 29 (2): 279-286 (2010) Limnetica, 29 (1): x-xx (2008) c_Asociaci'õn Ib'erica de Limnolog'õa, Madrid. Spain. ISSN: 0213-8409
9. N. Kingston & F. Marnell; Damselflies & Dragonflies Red List 2011; National Parks and Wildlife Service (2011) ISSN 2009-2016
10. B. M. Gohil and Devendra Solanki (2013); Population Status of Blister Beetle during Monsoon in Victoria Park Reserved Forest, Bhavnagar, Gujarat; Journal of Entomology and Zoology Studies; 1 (4): 77-80

Photographs of recorded species of Dragonflies of Victoria Park reserved forest



1. Ictinogomphus rapax (Common Clubtail),
2. Anax Parthenope (Blue-Tailed Brown Darner),
3. Acisoma panorpoides (Trumpet Tail),
4. Brachythemis contaminata (Ditch Jewel),
5. Bradinopyga geminata (Granite Ghost)
6. Crocothemis servilia (Ruddy Marsh Skimmer)
7. Diplacodes trivialis (Ground Skimmer)
8. Orthetrum glaucum (Blue Marsh Hawk)
9. Orthetrum Sabina (Green Marsh Hawk)
10. Pantala flavescens (Wandering Glider)
11. Rhyothemis variegata (Common Picture Wing)
12. Tramea limbata (Black Marsh Trotter)
13. Trithemis aurora (Crimson Marsh Skimmer),
14. Trithemis festiva (Black Stream Glider),
15. Trithemis pallidinervis (Long-Legged Marsh Skimmer)
16. Brachydiplax Sobrina (Blue Tailed Black Skimmer),
17. Orthetrum triangulare (Blue Tailed Forest Hawk)



Long-Legged Marsh Skimmer Mating Activity