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Biodiversity of Mosquitovorus dragonflies (Order: Odonata) from Kolhapur district including Western Ghats

T.V. Sathe and A.R. Bhusnar

Department of Zoology, Shivaji University Kolhapur (MS), India

ABSTRACT : Biodiversity protection and conservation is on national and international agenda and responsible for sustainable development of a region or a country and secondly dragonflies are potential bio control agents of mosquitoes. Therefore, biodiversity of mosquitovorus dragonflies of Kolhapur district including Western Ghats of Maharashtra has been studied. In all, 43 species of dragonflies were found feeding on mosquitoes. The important genera includes *Gomphus, Burmagomphus, Cyclogomphus Microgomphus, Anax, Macromia, Orthetrum, Potomarcha,* Pantala, Chlorogomphus, Epophthalmia, Indionyx, Amphithemis, Hylaeothemis, Heliogompuhus Davidiodies Bradinopyga, Crocothemis and Lameligomphus.

Keywords : Diversity, mosquitovorus dragonflies, Kolhapur, western Ghats.

INTRODUCTION

Dragonflies are commonly found near ponds, pools, rivers, streams, marshy places etc. They are reported from sea levels to over 3,600 M and from brakish marshy areas to desert lands from all over the world. Out of 5000 species reorted from the word, 500 species belonging to 139 genera of 17 families have been reported from India (Kulkarni and Prasad 2002). Prasad and Kulkarni, (2001) reported 71 species from Nilgiri Biosphere reserve and its environment. Prasad and Kulkanri, (2002) also reported additional 34 species from Kerala. From Western Ghats 138 species have been reported, but most of the studies are confined to Western Ghats of Kerala and very little attention is paid on the Western Ghats of Maharashtra except the work of Sathe and Shinde, (2008 a and b). Western Ghats is among the 18 hot spots of the world from the view point of conservation and protection of biodiversity. Secondly, dragonflies are potential bio-control agents of mosquitoes. Therefore, present study was undertaken. In past, Fraser (1933, 34, 36), Prasad (1995, 1996). Prasad and Varshney (1995), Prasad and Kulkarni (2001, 2002), Kulkarni and Prasad (2002), Sathe and Shinde (2006, 2007, 2008 a. b.) etc have worked on biodiversity of Odonata from India.

MATERIAL AND METHODS

Survey of dragonflies was made by visiting various Tahsils of Kolhapur district including westerns Ghats at weekly interval from the years 2008 - 10. Mostly, spot observation was followed by photography and rarely Odonates were collected from the Ghats for their identification. After noting characteristics the live dragonflies were released in the environment from where they collected. The dragonflies were identified by consulting Fraser (1933, 34, 36); Lahiri (1987), Silsby (2001), Sathe and Shinde (2008 a) etc. and mosquitoes were identified by consulting Smith (1973) and Sathe and Tingare (2010). Prey index have been prepared by spot observations and by providing 50 mosquito larvae to naids of dragonfly species in glass Aquarium size 3' × 2' × 1' (L × W × H).

RESULTS

The results recorded in table-1 shows that 31 species of mosquitovorus dragonflies were common and 12 species were rare in Kolhapur district including Western Ghats, Maharashtra.

Table 1 : Biodiversity, occurrence and mosquito preys of dragonflies.

FAMILY - GOMPHIDAE

Sr. No.	Dragonfly species	Sub-family	Prey species	Occurrence
1.	*Gomphus sp.*	Gomphinae	*Mosquitoes*	Common
2.	*Gomphus nilgiricus* (Laid law)	Gomphinae	*Anopheles spp.*	Common
3.	*Burmagomphus laidlaw* (Fraser)	Gomphinae	*Culex spp.*	Common
4.	*Burmagomphus* (Fraser) *pyramidalis*	Gomphinae	*Culex spp.*	Common

Contd..

5.	*Davidioides martini* (Fraser)	Gomphinae	*Anopheles spp.*	Common
6.	*Mesogomphus lineatus* (Selys)	Gomphinae	*Aedes spp. Anopheles spp.*	Rare
7.	*Lamelligomphus* (Fraser) *malbarensis*	Gomphinae	*Culex spp.*	Common
8.	*Lamelligomphus nilgiricus* (Fraser)	Gomphinae	*Aedes spp.*	Rare
9.	*Megalogomphus superbus* (Fraser)	Gomphinae	*Culex spp.*	Rare
10.	*Cyclogomphus ypsilon* (Selys)	Gomphinae	*Culex spp.*	Common
11.	*Cyclogomphus heterostylus* Gomphinae (Selys)	*Culex spp.*	Common (Sept. oct)	
12.	*Merogomphus longistigma tamaracherriensis* (Fraser)	Gomphinae	*Culex spp.*	Rare
13.	*Onychogompus striatus* (Fraser)	Gomphinae	*Culex spp.*	Rare
14.	*Acrogomphus sp.*	Epigomphinae	*Culex spp.*	Common
15.	*Mcirogomphus sp.*	Epigomphinae	*Anopheles spp.*	Common
16.	*Mcirogomphus longistigma* (Fraser)	Epigomphinae	*Anopheles spp.*	Rare
17.	*Heliogomphus sp.*	Epigomphinae	*Aedes spp.*	Common
18.	*Macrogomphus annulatus*	Epigomphinae	*Culex spp.*	Common
19.	*Macrogomphus* (Fraser) *Wynaadicus*	Epigomphinae	*Culex spp. Aaedes spp.*	Common
20.	*Ictinus sp.*	Inctinae	*Aedes spp.*	Rare
FAMILY – CORDULEGASTERIDAE				
21.	*Chlorogomphus* (Fraser) *xanthoptera*	Chlorogomphinae	*Culex spp.*	Common
22.	*Chlorogomphus campioni* (Fraser)	Chlorogomphinae	*Culex spp.*	Common
FAMILY – AESHNIDAE				
23.	*Anax parthenope* (Selys)	Anaxinae	*Aedes spp.Culex spp.*	Rare
24.	*Anax immaculifrons* (Rambur)	Anaxinae	*Aedes spp.*	Common
25.	*Gynacantha basiguttata* (Selys)	Aeshinae	*Aedes spp.*	Common
26.	*Gynacantha millaridi* (Fraser)	Aeshinae	*Anopheles spp.*	Common
FAMILY – LIBELLULIDAE				
27.	*Macromia indica* (Fraser)	Corduliinae	*Anopheles spp. Culex spp.*	Common

Contd..

28.	*Macromia flavincia* (Selys)	Corduliinae	*Anopheles spp. Culex spp.Adesesh*	Rare
29.	*Macromia flavovittata* (Fraser)	Corduliinae	*Anopheles spp. Culex spp.Adesesh*	Rare
30.	*M. cingulata* (Rambur)	Corduliinae	*Anopheles spp. Aedes spp.Culex spp.*	Common
31.	*Epophthalmia vittata vittata* (Burmeister)	Corduliinae	*Anopheles spp.*	Common
32.	*Epophthalmia frontalis binocellata* (Fraser)	Corduliinae	*Anopheles spp. Aedes spp.*	Common
33.	*Macromidia sp.*	Corduliinae	*Aedes spp.*	Common
34.	*Idionyx optata* (Selys)	Corduliinae	*Culex spp.*	Common
35.	*Hemicordulia asiatica* (Selys)	Corduliinae	*Anopheles spp. Culex spp.*	Common
36.	*Amphithemis mariae* (Laidlaw)	Libellulinae	*Culex spp.*	Rare
37.	*Hylaeothemis fruhstorferi* (Kirsch)	Libellulinae	*Aedes spp.*	Common
38.	*Potamarcha obscura* (Rambar)	Libellulinae	*Culex spp. Aedes spp.*	Common
39.	*Orthetrum sabina* (Drury)	Libellulinae	*Culex spp.*	Common
40.	*Pantala faviscens* (Rambur)	Libellulinae	*Anopheles spp. Culex spp.*	Common
41.	*Sympetrum sp.*	Libellulinae	*Anopheles spp.*	Rare
42.	*Crocothemis servilia servilia* (Drury)	Libellulinae	*Anopheles spp. Aedes spp.Culex spp.*	Common
43.	*Bradinopyga jaminata* (Rambur)	Libellulinae	*Anopheles spp., Culex spp., Aedes spp.*	Common

DISCUSSION

Augmentative release of biocontrol agents is practiced routinely in several countries for the suppression of mosquitoes (Corbet 1999). Thomas et al., (1988) studied efficacy of *Bradinopyga jaminata* and *Brachythemis contaminata* against mosquito larvae while, Santamarin and Mijares (1986) studied the mosquito larvae feeding potential of *Pantala flaviscens* and *Tramea abdominalis*. They tested *Culex quinquefaciatus* larvae against above two dragonflies and found that above dragonflies are good biocontrol agents of mosquito *C. quinquefaciatus*. The larvae of *Anopheles sinesis* have also been tested against *Sympetrum frequens* (Urabe *et al*., 1986). Very interestingly, *Aedes aegipti* mosquito population was suppressed upto 92% in Myanmar by using a libellulid dragonfly *Czocontenemis servelia* (Sebustian *et al*, 1990).

Recently, Sathe and Shinde (2008 b) prepared a index of dragonflies and their prey mosquitoes from Orus region of Sindhudurg district of Maharaqshtra (Western Ghats). Sathe and Shinde (2008, b) also demonstrated the use of dragonflies in insect pest management rather than mosquitoes. The present work will add great relevance in designing mosquito biological control programme by using dragonflies.

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REFERENCES

Corbet P.S. (1999). Dragon flies: Behaviour and ecology of Odonates, Corn. Uni. Press new and *Harley Books, Great Horetesty, UK.* 1.829

Fraser, F.C. (1933, 1934 and 1936). Fauna of British India including Ceylon and Burma. Odonata, 1: XIII + 423pp.2: XXIII + 398 pp. 3: XI+ 461pp., Taylor and Francis, London.

Fraser, F.C. (1957). A classification of the Order Odonata *R. Zool. Soc.* N.S.W. Sydney, 133pp.

Kulkarni, P.P. and Prasad, M. (2002). Insecta: Odonata Zool. Survey India: Wetland Ecosystem Series No. 3: Fauna of Ujani: 91-104.

Lahiri, A.R. (1987). Studies on odonate fauna of Megalaya. Rec. Zool. survey of India Misc. publ. Paper **99:** 402pp.

Prasad, M. (1995). On a collection of Odonata from Goa, India, *Fraseria* (N.S.), **12**(2)**:** 7-8.

Prasad, M. and Varshney, R.K. (1995). A checklist of Odonata of India including data on larval studies. *Oriental Ins.,* **29:** 385 – 428.

Prasad, M. (1996). An account of the Odonata of Maharashtra state, India. *Rec. Zool survey India,* **95**(3–14)**:** 305 -327.

Prasad, M. (1999). Faunal diversity in India: Odonata. Zoological survey of India, Calcutta, 177-178.

Prasad, M. and Kulkarni, P.P. (2001). Insecta: Odonata Zool. Surv. India: fauna of conservation Area series 11: fauna of *Nilgiri biosphre Reserve:* 73 – 83.

Prasad, M. and Kulkarni, P.P. (2002). Insecta: Odonata Zool Surv. India: Fauna of Eravikulam National Park. *Conservation Area series,* **13:** 7.9

Santamarina, H. and Mijares, A. (1986). Odonata as bioregulators of the larval phase of mosquitoes. *Revi.cubana de. Medina-Tropical,* **38111:** 89-97.

Sathe, T.V. and Shinde, K.P. (2006). On a new species of the genus *Rhyothemis* Hagen (Order: Odonata) from India. *J. Nat. Con,* **18:** 2421- 424.

Sathe, T.V. and Shinde, K.P. (2007). On a new species of the genus *Crocothemis* Brauer from Western Ghats, Maharashtra. *Flora and Fauna,* **2**(13)**:** 367-370.

Sathe, T.V. and Shinde, K.P. (2008a). Dragonflies and pest management. DPH New Delhi-1-179.

Sathe, T.V. and Shinde, K.P. (2008b). Biodiversity of dragonflies from Orus Sindudurga, Maharashtra. *Proc. Nat. Sem. Recent. Trends Life sci.* Belgaum **2:** 87-88.

Sathe, T.V. and Tingare, B.P. (2010). Biodiversity of mosquitoes. Mangl publ. New Delhi, 1-217.

Sebustian, A; Myint Sein, Myat Thu. And Philip S. Corbet. (1990). Suppression of *Aedes aegypti* (Diptera: Culicidae) using augumentative release of larvae Odonata: Libellulidae with community participation in Yangon, Myanmar. *Bull. Ento Res.,* **80:** 223-232.

Silsby, J. (2001). Dragonflies of the world: Natural History Museum and Plymbridge Distritutors Ltd. **1:** 124.

Smith, K.G.V. (1973). Insects and other arthropods of medical importance. T. B.M. London 37–107.

Thomas, M; Daniel, M.A. and Gladsutone, M. (1988). studies on the food preference in three species of Dragonfly naiads with particular emphasis on mosquito larvae predation. Bicovas, **1:** 34-41.

Urabe, V.K. Ikemoito, T and Aida. (1986). Studies on Sympetrum frequency (Odonata: Libellulidae) nymphs as natural enemy of mosquito larvae *Anopheles sinsensis* invice fields Z, Evalution of predatory capacity and efficiency in laboratory. *Jap. J. Sanid. Zool,* **3**(37)**:** 213-230.