



Biodiversity, Abundance and Prey Status of Odonates from Paddy Ecosystems of Kolhapur District, India

KEYWORDS

Damel flies, Dragonflies, Predators, Paddy ecosystem, insect pests, Kolhapur

* Dr. T. V. Sathe

Dr. Kiran Shinde

Professor, Department of Zoology, Shivaji University, Kolhapur 416 004, India. *Corresponding Author

Department of Zoology, Vivekanand College, Kolhapur

ABSTRACT In Kolhapur region paddy is widely cultivated. However, expected yield of the crop has not achieved so far because of damage caused by insect pests to the crops. Damselflies and dragonflies (Order Odonata) are predatory insects and good biocontrol agents of paddy insect pests and mosquitoes. Therefore, biodiversity, abundance and prey status of damselfly and dragonflies have been studied in paddy ecosystem of Kolhapur. A total of 36 species of odonates have been reported from paddy ecosystem belonging to the genera, *Crocothemis*, *Pantala*, *Anax*, *Neurothemis*, *Ichneura* etc. feeding on paddy moths, jassids, whiteflies and mosquitoes.

INTRODUCTION

Damselfly and Dragonflies (Odonata) are commonly found darting and dancing actively near ponds, pools, rivers, streams and also marshy places (Prasad & Kulkarni, 2001). Some species of Odonata are recorded perching high on trees and shrubs, considerably away from water and in dense forests. They are reported from sea levels to over 3,600 m and from brackish marshy areas to desert lands from all over the world. Out of 5,000 species reported from the world, 500 species belonging to 139 genera of 17 families have been reported from India (Kulkarni & Prasad, 2002; Frasar 1936). Recently, Prasad and Kulkarni (2001) reported 71 species from Nilgiri Biosphere reserve and its environment. Prasad & Kulkarni (2002) also reported additional 34 species from Kerala. From Western Ghats 138 species have been reported. Most of the studies are confined to Western Ghats of Kerala and very little attention is paid on the Western Ghats scattered in Maharashtra and agro ecosystems of Kolhapur region. Conservation, protection and utilization of dragonflies in biological control of paddy pests is the need of the day since pesticides lead several serious problems such as pollution, pest resistance, secondary pest outbreak, pest resurgence etc. Therefore, attempts have been made on biodiversity, abundance and prey status of damselfly and dragonflies from paddy ecosystems of Kolhapur. In past, Fraser (1933, 34, 1936), Prasad (1995, 1996), Prasad & Varshney (1995), Prasad & Kulkarni (2001, 2002), Kulkarni & Prasad (2002),

Sathe & Shinde (2008), Sathe (2010), Sathe et al. (2010) etc. have worked on biodiversity and biocontrol potential of Odonates from India.

MATERIALS AND METHODS

Survey of damselfly and dragonflies with respect to diversity, abundance and prey status was made by visiting various paddy agro ecosystems of Kolhapur fortnightly during the years 2011-2013. Mostly, spot observation was followed by photography and odonates were collected from the ecosystem for their morphological studies and after noting characteristics and measurements of body parts, they were released in the environment from which they collected. Observations on preys and feeding behaviour of damselfly and dragonflies have been noted from morning hr 7.00 a.m. to 8.00 a.m. by one man one hour search method. The odonates and prey insects were identified by consulting appropriate literature cited in the text.

RESULTS & DISCUSSION

The results recorded in table - 1 and figs. 1-4 indicated that in various agro ecosystems of paddy of Kolhapur region, 36 species have been noted. Out of which 6 species were rare and found feeding on paddy moths, jassids, white flies and mosquitoes (table - 1). Predatory status and abundance of damselfly and dragonfly species is given in table-1.

Table - 1 : Diversity, abundance and prey status of Odonates from Paddy ecosystems of Kolhapur district

Sr. No.	Species	Sub-family	Abundance	Prey status
	ZYGOPTERA (DAMSEL FLIES) Family - Coenagrionidae			
1.	<i>Lestes elata</i> Hagen	Lestinae	Common	MJM
2.	<i>Lestes umbrinus</i> Selys	Lestinae	Common	MJM
3.	<i>Ceylonolestes pulcherrima</i> (Fraser)	Lestinae	Rare	Jassids, white flies
4.	<i>Copera vittata</i> (Selys)	Platycnemidinae	Common	MJM
5.	<i>Caconeura ramburi</i> (Fraser)	Protoneurinae	Common	MJM
6.	<i>Disparoneura quadrimaculata</i> Rambur	Protoneurinae	Common	MJM
7.	<i>Chloroneura quadrimaculata</i>	Protoneurinae	Common	MJM
8.	<i>Indoneura ramburi</i> Fraser	Protoneurinae	Common	MJM
9.	<i>Esme cyaneovittata</i> Fraser	Protoneurinae	Common	MJM
10.	<i>Phylloneura westermanni</i> (Selys)	Protoneurinae	Common	MJM

11.	<i>Pseudagrion microcephalum</i> (Ramb.)	Coenagrinae	Rare	M & M
12.	<i>Archibasis mimetes praeclara</i> Fraser	Coenagrinae	Common	MJM
13.	<i>Ceriagrion rubiae</i> Laidlaw	Coenagrinae	Rare	MJ
14.	<i>Aciagrion accidentale</i> Laidlaw	Coenagrinae	Common	MJM
15.	<i>Ichneura senegalensis</i> (Rambur)	Coenagrinae	Common	MJM
16.	<i>Ichneura forcipata</i> Morton.	Coenagrinae	Common	MJM
17.	<i>Agriocnemis pleris</i> Laidlaw	Coenagrinae	Common	MJM
18.	<i>Coenagrion dyeri</i> Fraser	Coenagrinae	Common	MJM
19.	<i>Prodasineura verticalis annandalei</i> Fraser	Disparoneurinae	Common	MJM
Family - Agrididae				
20.	<i>Colocypha laidlawi</i> (Fraser)	Labellaginae	Rare	Mosquitoes Moths,
21.	<i>Labellago lineata indica</i> (Fraser)	Labellaginae	Common	MJM
22.	<i>Indophaea cardinalis</i> (Fraser)	Epallaginae	Common	MJM
23.	<i>Vestalis gracillis gracillis</i> (Fraser)	Agriinae	Common	MJM
24.	<i>Protostica anelopoides</i> Fraser	Platistictinae	Common	MJM

ANISOPTERA DRAGONFLIES				
Family - Gomphidae				
25.	<i>Gomphus nigricicus</i> Laidlaw	Gomphinae	Common	MJM
26.	<i>Burmogomphus laidlawi</i> Fraser	Gomphinae	Common	MJM
27.	<i>Macrogomphus longistigma</i> Fraser	Epigomphinae	Rare	Moths.
28.	<i>Macrogomphus wynaadicus</i> Fraser	Epigomphinae	Common	MJM
Family - Aeshnidae				
29.	<i>Anax immaculifrons</i> Rambur	Anaxinae	Common	MJM
Family - Libellulidae				
30.	<i>Macromia indica</i> Fraser	Corduliinae	Common	MJM
31.	<i>Orthetrum sabina</i> (Drury)	Libellulinae	Common	MJM
32.	<i>Diplacodes trivialis</i> (Rambur)	Libellulinae	Common	M. M.
33.	<i>Trithemis kirbyi kirby</i> Selys	Libellulinae	Rare	MJM
34.	<i>Pantala flavescens</i> (Fab.)	Libellulinae	Common	MJM
35.	<i>Crocothemis servilia servilia</i> Drury	Libellulinae	Common	MJM
36.	<i>Neurothermis tullia tullia</i> Drury	Libellulinae	Common	MJM

(MJM - Moth Jassids Mosquitoes, MM-Moth-Mosquitoes, MJ-Moth,Jassids.)

The most economical important dragonfly species were *P.flavescens*, *D. trivialis*, *C. servilia servilia* and *N. tullia tullia*. Six species were found rare in the district, while 30 species were common in the region (Table-1). The above mentioned 4 species found predated paddy pests such as borers (moths) and jassids and mosquitoes in the paddy ecosystem of Kolhapur, acting as good biocontrol agents of pests. Dragon flies are most neglected group of bio-control agents of insects although they have tremendous predatory potential. Therefore, dragonfly species should be mass reared and exploited on large scale in biological control of insect pests. The present work will add great relevance as base line data for biocontrol of insect pests as ecofriendly approach.

ACKNOWLEDGEMENT

Author is thankful to Shivaji University, Kolhapur for providing facilities.



Fig.1 *Pantala flavescens*



Fig. 2 *Crocothemis servilia*



Fig.3 Damselfly (Unidentified)



Fig.4 Damselfly *Ishnura* sp.

REFERENCE

- Fraser, F.C. 1933, 1934 & 1936. Fauna of British India including Ceylon and Burma. Odonata, 1 : XIII + 423 pp. 2 : XXIII + 398 pp. 3 : XI + 461 pp. Taylor and Francis, London. Fraser, F.C. 1957. A classification of the order Odonata. Rec. Zool. Soc. N.S.W. Sydney. 133 pp. Kulkarni P.P. and Prasad M. 2002. Insecta : Odonata. Zool. Surv. India : Wetland Ecosystem Series No. 3 : Fauna of Ujani : 91-104. Lahiri A.R. 1987. Studies on Odonate fauna of Meghalaya. Rec. Zool. Surv. India Misc. Publ. Paper 99 : 402 pp. Prasad M. 1995. On a collection of Odonata from Goa, India. Fraseria (N.S.), 2(12), 7-8. Prasad M. 1996. An account of the Odonata of Maharashtra State, India. Rec. Zool. Surv. India : 95 (3-14) , 305-327. Prasad M. 1999. Faunal diversity in India : Odonata. Zoological Survey of India, Calcutta, 171-178. Prasad M. & Varshney, R.K. 1995. A checklist of Odonata of India including data on larval studies. Oiental Ins., 29, 385-428. Prasad M. & P.P. Kulkarni, 2001. Insecta : Odonata. Zool. Surv. India : Fauna of Nilgiri Biosphere Reserve conservation Area series 11 : 73-83 pp. Prasad M. & P.P. Kulkarni 2002. Insecta : Odonata. Zool. Surv. India : Fauna of Eravikulam National Park. Conservation Area Series No. 13 : 7-9. | Silsby, J. 2001. Dragonflies of the world : Natural History Museum and Plymbridge Distributors Ltd., pp 1-124. Sathe, T.V. 2010. Biodiversity of damselfly nymphs (Odonata) from Koyana Dam and around area. Flora & Fauna, 16, 68-72. Sathe, T.V. & K.P. Shinde 2008. Dragonflies and pest management pp. 1-179. Daya Publ. House, New Delhi Sathe, T.V.; K.P. Shinde; T.M. Chougale & P.M. Bhoje 2010. Dragonflies (Order : Odonata) of Western Ghats of Sindhudurg district. Ani. Ecol. & Reprod., 6, 100-133. |