



RESEARCH ARTICLE

AN ANNOTATED CHECKLIST OF ODONATE FAUNA FROM SOUTHERN MARWAR REGION OF RAJASTHAN (INDIA)

*Mohammed Shakur

Biodiversity Research Laboratory, Zoology Department, Maharshi Dayanand Saraswati University, Ajmer -305009, Rajasthan, India

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ABSTRACT

Odonates were sampled from 3 sites i.e; 1. Jawai Dam, 2. Near Bijapur and 3. Jawai river near Aravalli. Southern Marwar region of Rajasthan reported 14 species belonging to Drangonflies (Family: Libellulidae) and 5 species Damsselflies and 3 species are recorded for the first time *Orthetrum cancellatum*, *Trithemis annulata*, *Rhodischnura nursei*.

INTRODUCTION

Odonates are primarily aquatic insects typified by beautifully colored and hovering insects commonly called the "Dragonfly" and "Damsselflies". They are ancient group of insects evolved during Carboniferous era. About 6,000 extant species are distributed all over the world. India is highly diverse about 500 species and sub species are reported (Manoj V. Nair. 2011, Dragonflies and Damsselflies of Orissa and Eastern, page 13.) and of this, particularly in Rajasthan 32 species are found. Odonata (order) is represented by 37 families. They are amphibiotic insects, inhabiting freshwater ecosystem exhibiting complete life cycle. Adults lay eggs in specific aquatic habitats. Larvae emerges from the eggs are carnivorous and voracious predators, they feed on crustaceans, aquatic insects, tadpoles and small fishes. Adult Odonates usually emerge during late evening or early morning. Emerged odonates colonize landscape surrounding the wetland. Male odonates are generally more brightly colored than females. Adults catch insects such as flies, mosquitoes, butterflies etc. (K.A. Subramanian. 2005, Dragonflies and Damsselflies of Peninsular India- A field guide). During breeding season adult males establish territories along wetlands, which they actively patrol and guard against other conspecific males.

Sexually mature and receptive females visit territories held by males. After a brief courtship, male and female odonates mate. Usually, males guide female to the egg laying site which are highly specific for each species.

The body of an Odonate is basically divided into three parts

- A head which has biting mouthparts, large well developed compound eyes capable of excellent omnidirectional vision;
- A thorax consisting of anterior prothorax bearing the front pair of legs, and a fused synthorax bearing the remaining two pairs of legs plus a pair of wings;
- A long thin abdomen consisting of 10 segments.

In males, the underside of the 2nd segment bears a complex secondary copulatory organ while the 10th segment in both sexes is tipped by structures called anal appendages. The finer details of wing venation and anal appendages are important for taxonomical analysis, serving to differentiate one species from the other. (Manoj V. Nair. 2011.). The Flight, have uncoupled wings, that is unlike moths, butterflies, wasps and bees, fore and hind wings are unattached to each other and they beat independently. The powerful thoracic muscles help them in long sustained flight and good maneuverability Odonates can hover and turn 180° while in flight and can fly backwards.

*Corresponding author: Mohammed Shakur

Biodiversity Research Laboratory, Zoology Department, Maharshi Dayanand Saraswati University, Ajmer -305009, Rajasthan, India
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Odonata is a order of most primitive winged carnivore insects. This order was earlier kept in the order Paleodictyoptera, which are precursors of modern Odonata. Odonata is divided into three suborders: Zygoptera, Anisoptera, and Anisozygoptera (Tolffski, 2004). It includes both the dragonflies' damselflies, (Williams and Feltmate, 1992). Dragonflies are such insect present in the world, which have not modified or evolved yet, with any gradual change in environment, they are still as their ancestors were. (Manisha Kol and Dr. Meshram, P. B. 2015, Literature review on Insect fauna [Odonata: Dragonflies and Damselflies] of Pachmarhi Biosphere reserve, Madhya Pradesh).

Ecological role of Odonata: These insects become marker, and indicator of wetland habit. Odonata is indicator of rich biodiversity of area. Presence of Odonata indicates existence other kind of flora and fauna winged carnivore insects (Manisha Kol and Meshram, 2015).

Key to Dragonflies and Damselflies

Dragonflies (Anisoptera) are usually strong flyers, often hunting a regular beat, may be found well from water. They have huge compound eyes with 30,000 to 40,000 facets. When at rest the wings are spread out at right angles to the body. The eyes are large, touching at some point. The hind wings are broader than the forewings and the abdomen is stout. Damselflies (Zygoptera) are generally smaller.

They have a weaker weak fluttering flight and usually stay close to vegetation or to the water surface. Their eyes are smaller and separated and when at the rest they usually fold the wings so that they lie in line with the body. The fore and hind wings are narrowed at the base and similar in size and shape, the abdomen is slender and the wings are kept closed over the body. (Andrew R.J. Subramaniam K.A. and Triple A.D, 2008. A handbook on common Odonates of central India published for "The 18th International symposium of Odonatology".)

Materials and Methods: Study Area: The study was conducted in South Rajasthan to explore diversity of Odonata from Rajasthan (23°04' - 30°11' N and 69°29' - 78°17' E) is the largest state of India in term of geographical area and occupying 3,42,239 km squares land area. The world oldest mountain ranges "Aravalli" running diagonally across the state and into two halves :-

North – West part come under the Thar Desert and covers about 62 % of the state area while South - East part is much greener and comes under Hadoti plateau. Odonates were sampled from 3 sites i.e;

- **Jawai Dam** (25°04'14" N and 73°09'24" E), is a dam across the Jawai river, tributary of Luni river. The dam built by Maharaja Umaid Singh of Jodhpur. The biggest dam in western Rajasthan, its capacity of 7887.5 million cubic feet and cover area 414.05 km. square. Jawai dam being the winter paradise for migratory birds and as well as the home for crocodiles. Leopard sighting is also the speciality of this area.
- **Near Bijapur**, (25°03'25" N and 73°15'18"E) is village in the Pali district of Rajasthan. The older name was "Vijapur". A river named Jawai passes across this village encompassing almost half of the village.

A pilgrimage is located nearby to village named "Rata Mahaveer Ji" or "Hathundi Teerth" which was built in year 313(370V.S.) and was earlier dedicated to Parshvanatha but after installation idol of Shri Mahaveer Bhagwan in year 1278(1335V.S.) this temple has Bhagwan Mahaveer Swami as its primary deity.

Jawai river near Aravalli (25°03'31" N and 73°17'15"E) The present study is based on the observation of Odonata from this river. This river is perennial, arising from Goriya Village located on foothills of Aravalli. The study was conducted during October in Southern part of state because it is much greener and contains rivers and wetlands.

Results: – List of diversity

Scientific classification of Odonates:

Family - Libellulidae (Dragonfly)

Also known as "Skimmer" family, large group of most common and colorful dragonflies.

Key Features: Patterned wings and bright colors on the thorax and abdomen.

Robust primary antennoid absent.

- The males look really good with orange coloration to their wings, thorax and abdomen change color slightly as it ages, from light brown to a more deep orange.... *Brachythemis*
- In Male, the prothorax and thorax are cinereous or dirty pale yellow/white, marbled and peppered with black/grey in very irregular manner..... *Bradinopyga*.
- Discoidal field (i.e. cell rows projecting beyond) in hind wing at least slightly expanded at wing margin..... *Crocothemis*.
- Thorax, Greenish yellow or olivaceous. The dorso-lateral area is violet brown and is speckled with minute dots..... *Diplocodes*.
- Arculus at or distal to antenodal last antenodal in forewing complete mature adults often blue pruinose, especially males..... *Orthetrum*.
- Pterostigma in all wings equal (about 2.5 mm long), hind wing not conspicuously broadened at its base; legs or femur black and tibia red..... *Trithemis*.

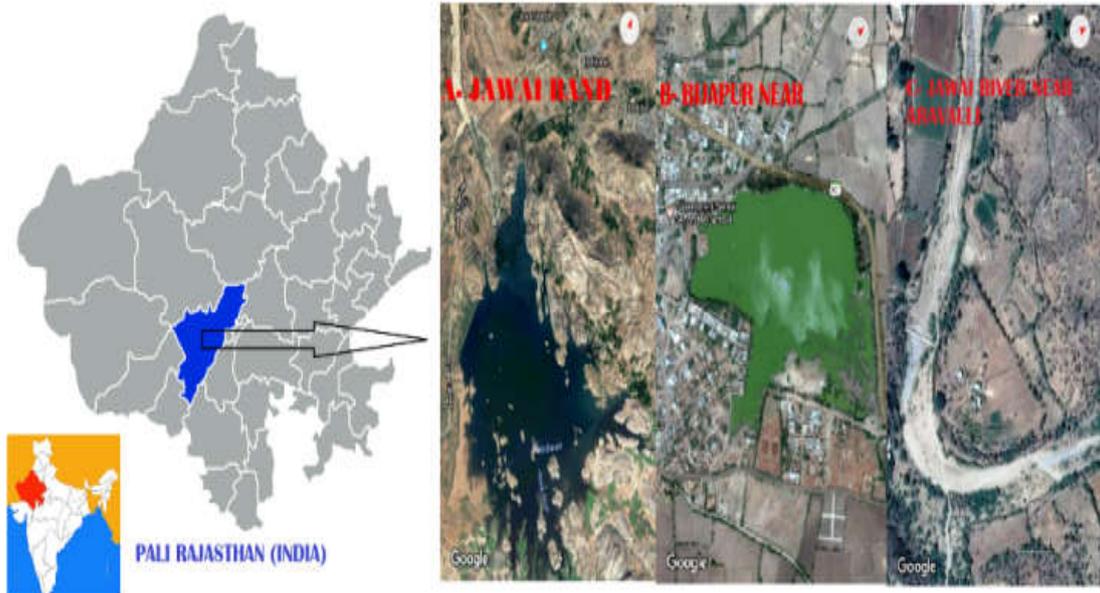
Family – Coenagrionoidea (Damselflies)

The family is referred to as the narrow-winged damselflies or the pond damselflies, making largest family of damselflies. It has six subfamilies.

Key features: Usually have a black pattern and two antenodal cross veins.

Ground color may be green, blue, yellow, orange, or purple. Narrow, stalked, usually colorless and clear wings.

- Wing spot, golden yellow eye, olivaceous above, golden brown thorax, pale greenish below medium size green damselfly with bright yellow abdomen..... *Ceriagrion*.



Ditch jewel



Granite ghost



Marsh skimmer



Ground Skimmer



Southern skimmer



Black-tailed skimmer



Blue marsh hawk



Slender Blue Skimmer



Slender skimmer



Violet dropwing darter



Crimson marsh glider



Long-legged marsh glider



Common scarlet-darter

S.No.	Scientific Name	Common Name	IUCN Category
01.	<i>Brachythemis contaminata</i>	Ditch jewel	LC
02.	<i>Bradinyoga geminate</i>	Granite ghost	LC
03.	<i>Crocothemis erythraea</i>	Common scarlet-darter	DD
04.	<i>Crocothemis servilia</i>	Ruddy marsh skimmer	LC
05.	<i>Diplocodes trivialis</i>	Ground Skimmer	LC
06.	<i>Orthetrum brunneum</i>	Southern skimmer	LC
07.	<i>Orthetrum cancellatum</i> *	Black-tailed skimmer	LC
08.	<i>Orthetrum glaucum</i>	Blue marsh hawk	LC
09.	<i>Orthetrum luzonicum</i>	Slender Blue Skimmer	LC
10.	<i>Orthetrum sabina</i>	Slender skimmer	LC
11.	<i>Trithemis annulata</i> *	Violet dropwing darter	LC
12.	<i>Trithemis aurora</i>	Crimson marsh glider	LC
13.	<i>Trithemis pallidinervis</i>	Long-legged marsh glider	LC

14.	<i>Ceriagrion coromandelianum fabricius</i>	Coromandel marsh dart	LC
15.	<i>Ischnura aurora</i>	Golden dartlet	LC
16.	<i>Ischnura senegalensis</i>	Senegal golden dartlet	LC
17.	<i>Rhodischnura nursei</i> *	Pixie dartlet	LC
18.	<i>Lestes sp.</i>	-----	--



Golden dartlet



Pixie dartlet



Coromandel marsh dart



Senegal golden dartlet

- Two azure blue spots are present behind the eye, the second and seventh segment has upper narrow and broad black marks respectively, segment 8-10 are entirely azure blue..... *Ischnura*
- Wing spot, pale yellow in fore wing uncolored in hind wing eye, green paling to yellow small unmistakable black, red and yellow damselfly. Older males show less yellow on the abdomen..... *Rhodischnura*.

Family - Lestidae (Damselflies)

Damselflies in the Lestinae rest with their wings partly open, while those in the Sympecmatinae, the reedlings, ringtails, and

winter damselflies, rest with their wings folded. Basal (lower) portion of labium (lower lip) greatly narrowed (spoon-shaped).

DISCUSSION AND CONCLUSION

- A list of 18 species of Odonates is known to occur in Southern Marwar region of Rajasthan, is given and a field key to their identification is provided.
- These 18 species, 14 species belonging to Drangonflies (Family: Libellulidae) and 5 species Damselflies (Family: Coenagrionoidea and Lestidae).

- The family Libellulidae, 14 species from the largest single group in the Odonata fauna of Southern Marwar of Rajasthan.
- The following 3 species are accorded for the first time from Southern Rajasthan:-
- Black-tailed skimmer (*Orthetrum cancellatum*),
- Violet dropwing darter (*Trithemis annulata*),
- Pixie dartlet (*Rhodischnura nursei*).

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