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## A Preliminary survey of Dragonflies and Damselflies (Insecta: Odonata) in and around Hirpora Wildlife Sanctuary Shopian, Kashmir

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### ABSTRACT

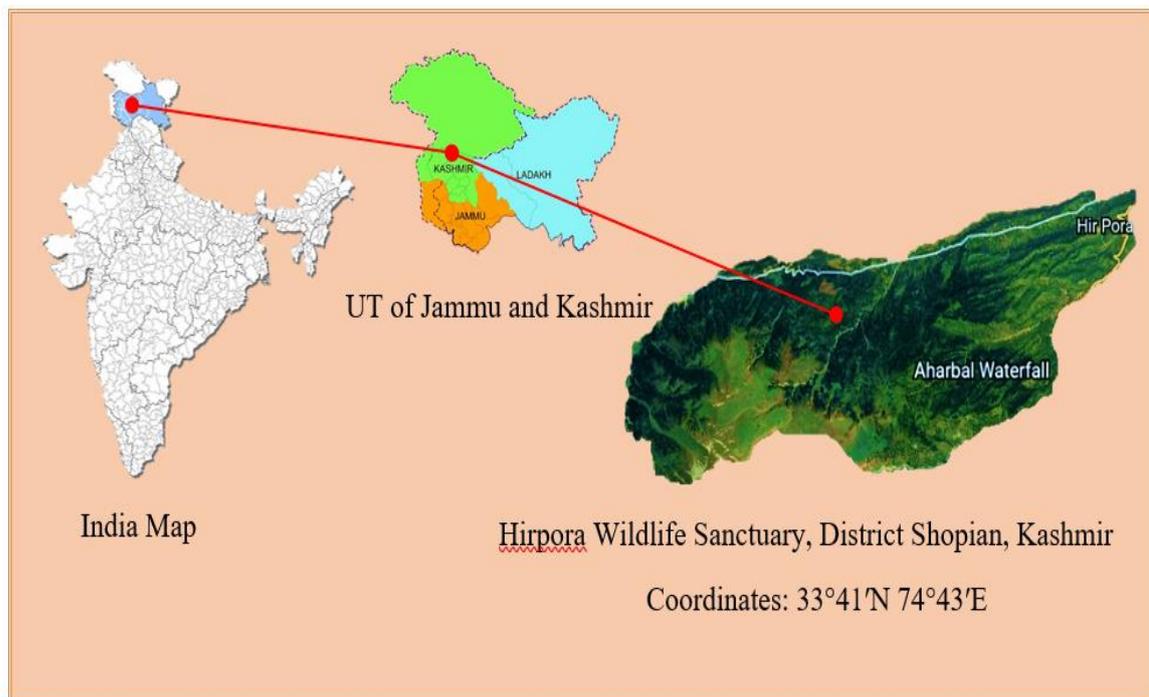
Dragonflies and Damselflies (Insecta: Odonata) of Hirpora Wildlife Sanctuary are presented. The Sanctuary is located in the District Shopian of Kashmir Valley (33°39'28.6"N 74°41'15.2"E). The area is rich in both floral and faunal diversity with most of the area covered with lush green forests. Around the sanctuary, Agro and Horticultural plantations such as Apple, Pear, Peach and vegetable crops abides most of the land cover in the area. The present study was carried out from June to October 2020. A total number of 10 species from six families were recorded in and around the area. The most abundant species recorded are from the family Libellulidae which are active mostly in the months from June to October. A number of freshwater bodies flow through the district and receives annual precipitation of around 1800mm, which makes the area more suitable for the Odonates diversity. Here we present the first preliminary report of order Odonata collected from the sanctuary and adjoining areas of Kashmir Valley.

### INTRODUCTION

Dragonflies and Damselflies are undoubtedly one of the natural world's design classics with a uniquely adapted body plan and behaviour repertoire that has stood the test of time. These species are the ancient group of insects that belong to the order Odonata and are considered as the ecological indicators. A total number of around 6338 species from 693 genera of Odonates have been reported so far across the globe, Paulson and Schorr (2020). In India, 496 species, 27 subspecies from 154 genera and 18 families have been reported from India, Subramanian and Babu (2020); Joshi and Sawant (2020); Bedjanič *et al*, (2020); Payra *et al*, (2020). Kashmir Valley is rich in both faunal and floral diversity. However, most areas of the valley are underexplored besides some of the brief studies of the order Odonata from Jammu and Kashmir, Bashir *et al*, (2017); Sheikh *et al*, (2020); Maqbool and Kant (2015).

## MATERIALS AND METHODS

Hirpora Wildlife Sanctuary is located at the foothills of Pir Panjal Mountain Range, surrounded by the snowclad and sky-scraping mountain ranges of Inner Himalayas. The Hirpora Wildlife Sanctuary shares its boundaries with Lake Gumsar to the North, Rupri to the East, Suransar to the South, Pir Panjal to the West and Hirpora Village to Northeast. The Sanctuary comes under the jurisdiction and forest division of District Shopian of Kashmir Valley ( $33^{\circ}41'N$   $74^{\circ}43'E$ ) which lies in the southern escarpment of Kashmir Division (Fig. 1). The District Shopian is the catchment for two major tributaries of the Jhelum; the Rambiara and Aharabal as well. The Sanctuary has a total area of  $341.25 \text{ km}^2$  Ahmad et al, (2015), with most of the land cover is under forests followed by pastures, wastelands and water bodies including many alpine lakes. The Sanctuary was established in the year 1987 with the aim to conserve Snow trout, Markhor, Musk deer, Snow Leopard, Himalayan Black Bear etc. The area comprises Western mixed coniferous forests and deciduous sub-alpine scrub forests. The average temperature lies in between  $20^{\circ} \text{ C}$  to  $25^{\circ} \text{ C}$  during summers and autumn, while the minimum temperatures lie between  $-15^{\circ} \text{ C}$  to  $10^{\circ} \text{ C}$  during winter and early spring.



**Fig. 1** Hirpora Wildlife Sanctuary on Jammu and Kashmir and India Map

At an altitude of 2546 m, Hirpora Wildlife Sanctuary is a home to many species of plants and animals. The area receives annual precipitation of around 1800 mm which makes this forest ecosystem favourable for the Odonata species as rainwater will get stored in the pools within the sanctuary, where dragonflies lay eggs. Apart from the pools, (Image 1), a number of brooks (Images 2 & 3) flow through the sanctuary as well. The field survey was carried out from June to October 2020. The species were photographed using Redmi Note 8 Pro Cell Phone + 20 mm macro lens and collected using aerial nets.



**Image 1.** A natural pool full of rainwater formed inside the sanctuary  
(Photo: Muzafar Riyaz)



**Image. 2** A tribal hut and a stream flowing through Hirpora Wildlife Sanctuary  
(Photo: Muzafar Riyaz)



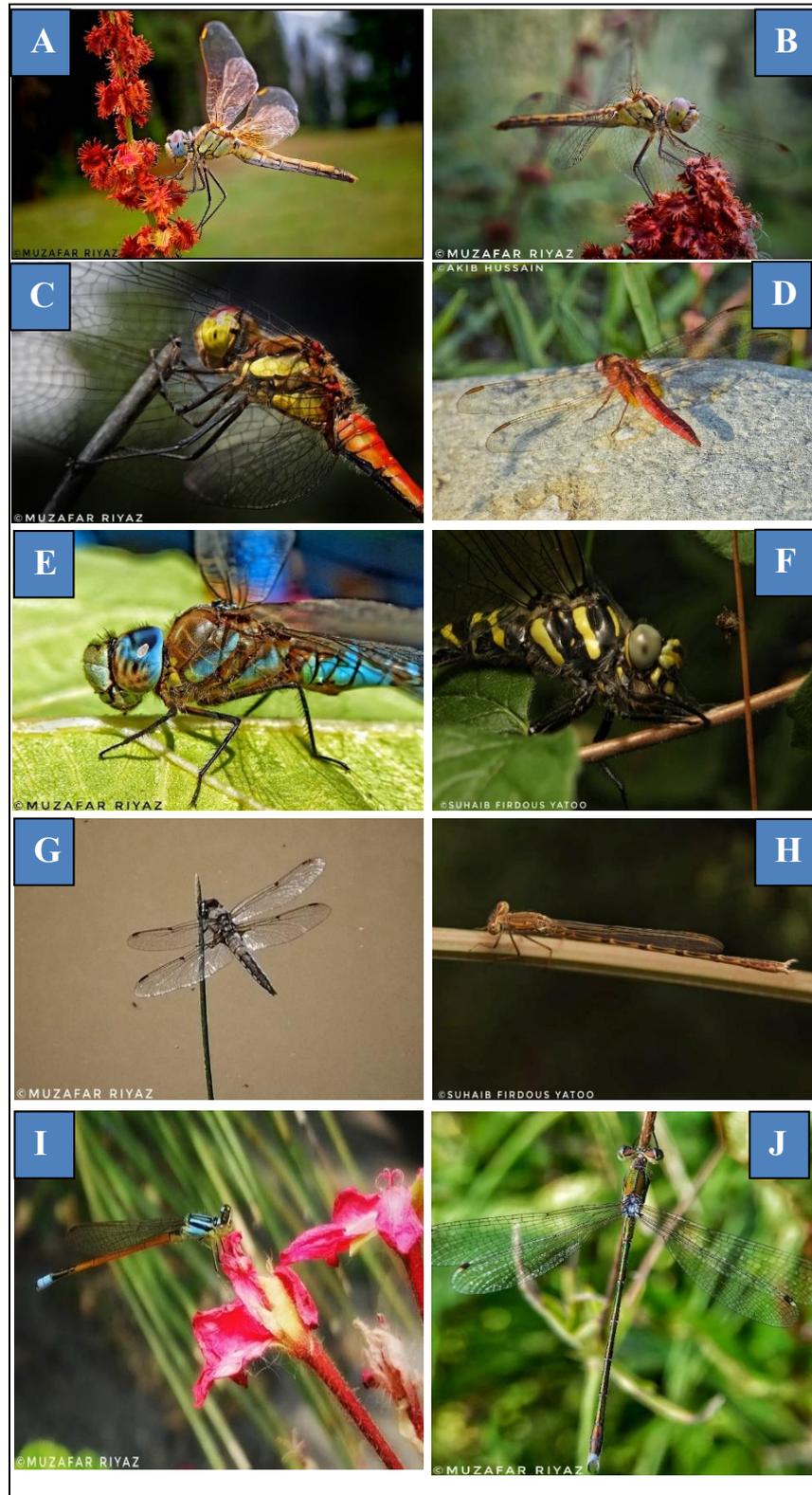
**Image 3.** A brook flowing between *Abies pindrow* (West Himalayan Fir) Trees in Hirpora Wildlife Sanctuary (Photo: Muzafar Riyaz)

## RESULTS

During this study, a total number of 10 species of Odonata were recorded including 7 species of Dragonflies (Odonata: Anisoptera) belonging to 3 families; Libellulidae Cordulegastridae, Aeshnidae and 3 species of Damselflies (Odonata: Zygoptera) belonging to 3 families; Lestidae Coenagrionidae and Synlestidae (Table. 1& Fig.2). The most abundant, common and frequently visitor species were recorded from the family Libellulidae (5), followed by Cordulegastridae (1), Aeshnidae (1), Lestidae (1), Coenagrionidae (1), Synlestidae (1). Most of the species were active and observed from June to October with maximum day temperature ranges between 20-25°C.

**Table 1.** Checklist of Order Odonata in and around Hirpora Wildlife Sanctuary Shopian

S. No.	Family	Scientific name	Location Coordinates	Habitat	Abundance	Period
1	Libellulidae	<i>Sympetrum fonscolombii</i> Selys, 1840	33°40'18"N 74°42'16"E	Forest-Stream	Common	June-October
2		<i>Sympetrum striolatum</i> Charpentier, 1840	33°40'39"N 74°44'41"E	Forest-Stream	Common	June- October
3		<i>Sympetrum commixtum</i> Selys, 1884	33°40'39"N 74°44'41"E	Forest-Stream	Common	June- October
4		<i>Crocothemis servilia</i> Dury, 1770	33°40'40"N 74°40'10"E	Forest-Stream	Common	June- October
5		<i>Libellula quadrimaculata</i> Linnaeus, 1758	33°39'42.4"N 74°46'40.8"E	Forest-Pool	Common	June- October
6	Cordulegastridae	<i>Cordulegaster brevistigma</i> Selys, 1854	34°17'36"N 74°26'29"E	Forest-Stream	Common	June- October
7	Aeshnidae	<i>Aeshna mixta</i> Latreille, 1805	33°40'39"N 74°44'41"E	Forest-Stream	Common	June- October
8	Lestidae	<i>Sympetma paedisca</i> Brauer, 1877	34°17'36"N 74°26'29"E	Forest-Stream	Occasional	June- October
9	Coenagrionidae	<i>Ischnura inarmata</i> Calvert, 1898	34°04'27.2"N 74°50'22.5"E	Wetland	Occasional	June- October
10	Synlestidae	<i>Megalestes major</i> Selys, 1862	33°41'13"N 74°47'03"E	Forest-Stream	Occasional	June- October



**Fig.2:** Photographs of observed and collected species of Dragonflies and Damselfies  
(Order: Odonata)

- A.** *Sympetrum fonscolombii*, **B.** *Sympetrum striolatum*, **C.** *Sympetrum commixtum*,  
**D.** *Crocothemis servilia*, **E.** *Aeshna mixta*, **F.** *Cordulegaster brevistigma*,  
**G.** *Libellula quadrimaculata*, **H.** *Sympecma paedisca*, **I.** *Ischnura inarmata*,  
**J.** *Megalestes major*

## DISCUSSION

Dragonflies and Damselflies of Kashmir Valley have not been studied and explored properly. The present study was a brief survey and exploration of Odonata species in the Hirpora Wildlife Sanctuary, Shopian and its adjoining areas. The study observed 10 Odonata species from 6 different families. The collected species from different locations will be added to the database of Entomofauna of Kashmir Valley and India as well. The study also aims to explore more areas in the future as well, since the area is yet to be fully explored, it's very likely that many new species are awaiting the discovery.

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### Disclosure Statement

The authors declare no conflict of interest.

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## ARABIC SUMMARY

مسح أولي لليعسوب والدامسيلز في محمية Hirpora للحياة البرية، كشمير، الهند

**Muzafar Riyaz and K. Sivasankaran\***

قسم التصنيف والتنوع البيولوجي، معهد أبحاث الحشرات، كلية لويولا، تشيناي، تاميل نادو، الهند

يتم تقديم اليعسوب والدامسيلز (Insecta: Odonata) من محمية Hirpora للحياة البرية. يقع الحرم في منطقة شوبيان بوادي كشمير (33° 28.6'39" شمالاً 74° 15.2'41" شرقاً). المنطقة غنية بالتنوع الزهري والحيواني حيث تغطي معظم المساحة الغابات الخضراء المورقة. حول المحمية، تشغل المزارع الزراعية والبستانية مثل محاصيل التفاح والكمثرى والخوخ والخضروات معظم الغطاء الأرضي في المنطقة. أجريت الدراسة الحالية في الفترة من يونيو إلى أكتوبر 2020. تم تسجيل إجمالي عدد 10 أنواع من ست عائلات في المنطقة وحولها. أكثر الأنواع التي تم تسجيلها وفرة هي من عائلة Libellulidae التي تنشط في الغالب في الأشهر من يونيو إلى أكتوبر. يتدفق عدد من المسطحات المائية العذبة أيضًا عبر المنطقة وتتلقى المنطقة هطولاً سنوياً يبلغ حوالي 740 ملم، مما يجعل المنطقة أكثر ملاءمة لتنوع Odonates. نقدم هنا التقرير الأولي لأول الأمر Odonata الذي تم جمعه من المحمية والمناطق المجاورة لوادي كشمير.