



# JOURNAL OF BIODIVERSITY AND CONSERVATION

## Odonates of Jamtara Forest Division, Jamtara, Jharkhand, India

Bankar Ajinkya Devidas<sup>1</sup>, Subhalakshmi Rout<sup>2</sup> and Sanjeet Kumar<sup>2\*</sup>

<sup>1</sup> Office of Divisional Forest Officer, Jamtara Forest Division, Jamtara, Jharkhand, India

<sup>2</sup> Animal Science Division, Ambika Prasad Research Foundation, Odisha, India

\*Email-Id: sanjeetaprf@gmail.com

---

### ARTICLE INFO

---

#### Article History

Received: 15 October 2023

Keywords: Bioindicator, carnivore, damselfly, dragonfly,  
pollution

Received in revised form: 31 October 2023

Accepted: 1 November 2023

---

### Abstract

*Odonata is an order consisting of flying insects that include dragonflies and damselflies. The dragonflies are placed in the sub-order Anisoptera and Anisozygoptera, usually being larger, with eyes together and unequal wings up or out at rest, while damselflies belonging to sub-order Zygoptera, are usually smaller with eyes placed apart and wings along the body at rest. They are bio-indicators of healthy water bodies as they require fresh water for their survival. They play a major role in pest control being carnivores for their whole life cycle and maintaining prey-predator relationship. Keeping the importance of Odonates in mind, an attempt has been made to document the Odonata diversity of Jamtara Forest Division (JFD), Jharkhand from May 2023 to October 2023. The present study has documented 30 Odonata species belonging to 5 families under 23 different genera and recommend strategies to protect and conserve their habitat and population.*

---

### INTRODUCTION

The term Odonata is derived from the Greek word “Odonto” meaning tooth as the adult Odonates have strong teeth on the mandible. They are one of the ancient orders of insects and

are widely distributed in all geographical realms with approximately 6,256 species across the world, but their diversity is highest in the tropics and India is home to approximately 487 species from 18 families (Siddique 2019). They are eye-catching insects with rounded eyes, long slender colorful tails, and two pairs of large veined wings flying around using their powerful flight muscles or often perched near paddy fields, ponds, lakes, marshes, etc. The body of the Odonates is divided into three parts which are a head, large well-developed compound eyes capable of excellent vision; a thorax consisting of anterior prothorax bearing the front pair of legs, and a fused synthorax consisting of the remaining two pairs of legs along with a pair of wings; and a long thin abdomen consisting of 10 segments. In males, the underside of the 2<sup>nd</sup> segment bears a complex secondary copulatory organ while anal appendages tip the 10<sup>th</sup> segment in both sexes. The wing venation pattern and anal appendages are important for taxonomical analysis, differentiating one species from the other (Nair 2011). Based on the body structure, Odonata is divided into three groups, viz. damselflies (Zygoptera), primitive dragonflies (Anisozygoptera), and dragonflies (Anisoptera). They act as good bio-indicators of healthy water bodies as they are primarily aquatic insects that are dependent on fresh water for their entire life to survive (Pelli 2019). The larvae spend their whole life entirely in the water and the adults are found in and around water bodies. They are strong, fast, and excellent fliers and are the fiercest predators in the Insecta class. Often damselflies are confused with dragonflies, but they are smaller with slimmer abdomens and weaker flight (Bomphrey et al. 2016). They are carnivores, larvae stalk and ambush their prey in water and adults capture their prey in flight by remaining stationary as a motion camouflage technique to confuse the prey. They sometimes cannibalize other dragonflies or damselflies (Edgehouse and Brown 2014).

The lifecycle of Odonates is completed in three stages; egg, larva, and adult. The eggs are round, pale yellow in color, and have a rice-like shape. The female dragonfly dips the last segment in water while flying or hovering and lays about 100-400 eggs per batch while the damselfly inserts its eggs in living or dead plant tissue. The eggs hatch into larvae which undergo a series of molts and grow, then shed the old larval case to turn into adults. When the adult male and female Odonates are ready to mate and reproduce, they return to the breeding grounds where the male holds the female by its neck in tandem position, and the female curls up its abdomen to the male's secondary genitalia to receive sperm (Stoks and Aguilar 2012). Being cold-blooded organisms, they are often found in the basking posture with their wings outstretched in the mornings to raise their body temperature and during summer, they point

the tip of their abdomen up to the sky in an obelisk posture to minimize the surface area of exposure to the sun to prevent themselves from overheating (Figure 2). In the evenings, Odonates move towards low grass, bushes, or trees to rest in roosting or resting position. Odonates are predators in both larval and adult stages of their lives and help in controlling the pest population by feeding on mosquitoes and other insects that spread diseases. They are also prey to birds, fish, amphibians, reptiles, and mammals providing them a rich diet of proteins and essential amino acids. They play an important role in maintaining the ecological balance. Nowadays, humans have become a major threat to the habitat of Odonates (Figure 3).

Their population is also declining due to rapid urbanization, pollution, and global warming. Keeping the importance of odonates for ecological balance and the threat to their habitat and population in mind, a survey was conducted in Jamtara Forest Division, Jharkhand, India, from May 2023 to September 2023 to document their diversity in the study area and pay more attention to the conservation strategies to maintain their population in the ecosystem.

## METHODOLOGY

Field surveys were conducted in the four ranges (Jamtara Range, Kundahit Range, Narayanpur Range, and Nala Range) of Jamtara Forest Division (JFD), Jharkhand, from May 2023 to September 2023 to explore Odonata diversity (Kumar and Devidas, 2023; Kumar 2023; Ajinkya et al. 2023a; Ajinkya et al. 2023b; Rout et al. 2023; Mishra et al. 2023a; Mishra et al. 2023b; Mishra et al. 2023c). The photographs of odonates were taken, sighted, and identified in the field as per their morphological characteristics with the help of the books “Dragonflies and Damselflies of Orissa and Eastern India” (Nair 2011) and “Dragonflies and Damselflies in and around Delhi” (Siddique 2019). During the survey, none of the Odonates were harmed or killed.

## RESULTS AND DISCUSSION

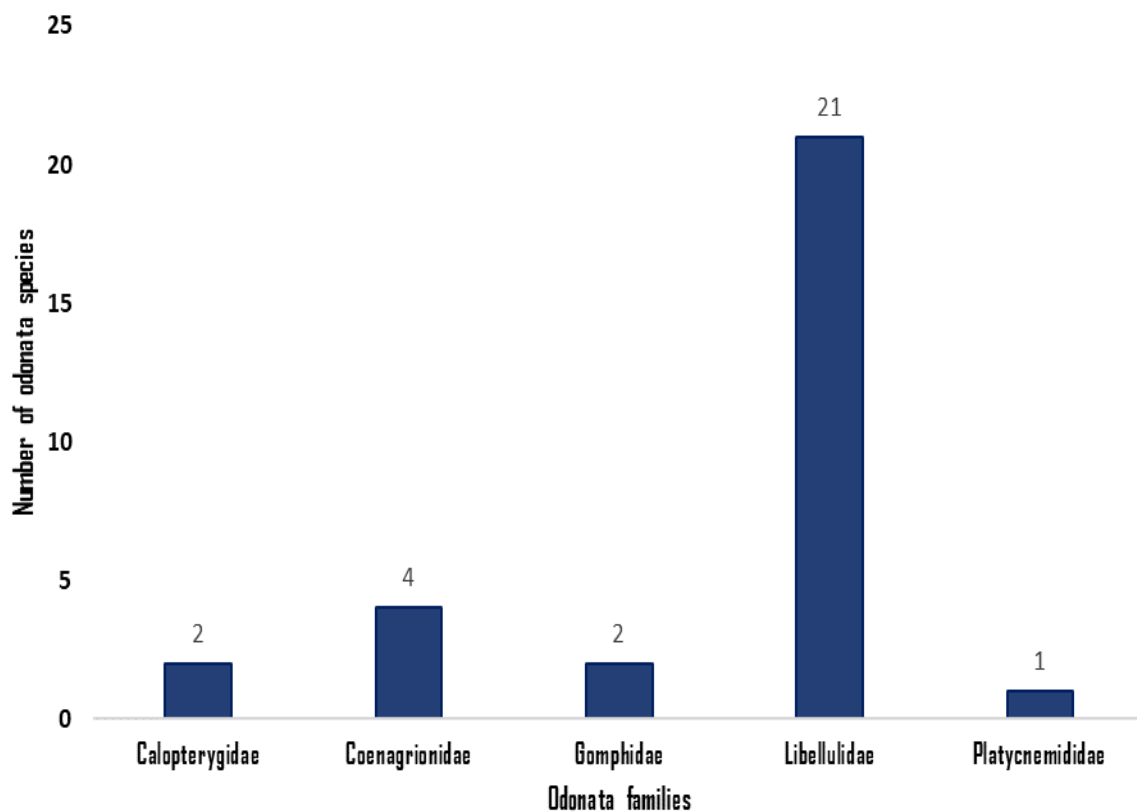
The field survey revealed that JFD enjoys about 30 Odonata species belonging to 5 families under 23 different genera, with the family Libellulidae being dominant among the studied families (Table 1). Out of the 30 Odonata species, 2 damselfly species belonged to Family Calopterygidae, 4 damselfly species to Family Coenagrionidae, 2 dragonfly species to Family Gomphidae, 21 dragonfly species to Family Libellulidae, and 1 damselfly species to Family Platycnemididae (Figure 1). Details are listed in Table 1 and demonstrated in Plate 1.

**Table 1: Some common Odonates of Jamtara Forest Division (JFD)**

Scientific name	Common name	Family
<i>Agriocnemis pygmaea</i>	Pygmy dartlet	Coenagrionidae
<i>Brachydiplax sobrina</i>	Little blue marsh hawk	Libellulidae
<i>Brachythemis contaminata</i>	Ditch jewel	Libellulidae
<i>Bradinopyga geminata</i>	Granite ghost	Libellulidae
<i>Ceriagrion coromandelianum</i>	Coromandel marsh dart	Coenagrionidae
<i>Copera marginipes</i>	Yellow bush dart	Platycnemididae
<i>Crocothemis servilia</i>	Ruddy marsh skimmer	Libellulidae
<i>Diplacodes nebulosa</i>	Black-tipped ground skimmer	Libellulidae
<i>Diplacodes trivialis</i>	Ground skimmer	Libellulidae
<i>Ictinogomphus rapax</i>	Common clubtail	Gomphidae
<i>Ischnura rubillio</i>	Golden dartlet	Coenagrionidae
<i>Lathrecista asiatica</i>	Asiatic bloodtail	Libellulidae
<i>Neurobasis chinensis</i>	Stream glory	Calopterygidae
<i>Neurothemis fulvia</i>	Fulvous forest skimmer	Libellulidae
<i>Neurothemis intermedia</i>	Ruddy meadow skimmer	Libellulidae
<i>Orthetrum glaucum</i>	Blue marsh hawk	Libellulidae
<i>Orthetrum luzonicum</i>	Tricoloured marsh hawk	Libellulidae
<i>Orthetrum pruinosum</i>	Crimson-tailed marsh hawk	Libellulidae
<i>Orthetrum sabina</i>	Green marsh hawk	Libellulidae
<i>Pantala flavescens</i>	Wandering glider	Libellulidae
<i>Paragomphus lineatus</i>	Common hooktail	Gomphidae
<i>Potamarcha congener</i>	Yellow-tailed ashy skimmer	Libellulidae
<i>Pseudagrion rubriceps</i>	Saffron-faced blue dart	Coenagrionidae
<i>Rhyothemis variegata</i>	Common picture wing	Libellulidae
<i>Tramea basilaris</i>	Red marsh trotter	Libellulidae
<i>Trithemis aurora</i>	Crimson marsh glider	Libellulidae

<i>Trithemis festiva</i>	Black stream glider	Libellulidae
<i>Trithemis pallidinervis</i>	Long-legged marsh glider	Libellulidae
<i>Urothemis signata</i>	Greater crimson glider	Libellulidae
<i>Vestalis gracilis</i>	Clear-winged forest glory	Calopterygidae

Other researchers have also reported the diversity of Odonata from different areas of Jharkhand state. Sajan et al. (2014) reported 30 species of Odonata at seven different ranges of Palamau Tiger Reserve, Jharkhand, India in a preliminary checklist of species of which 20 species were from Anisoptera and 10 species from Zygoptera. Babu and Nandy (2014) recorded 8 Anisoptera species from the Aeshnidae, Gomphidae, and Libellulidae families, new for the state of Jharkhand during a field survey carried out from 2008-2010 in various districts of the state. Hazra et al. (2020) reported a well-preserved first fossil dragonfly recovered from the late Neogene sediments of the Chotanagpur plateau, Jharkhand, Eastern India.



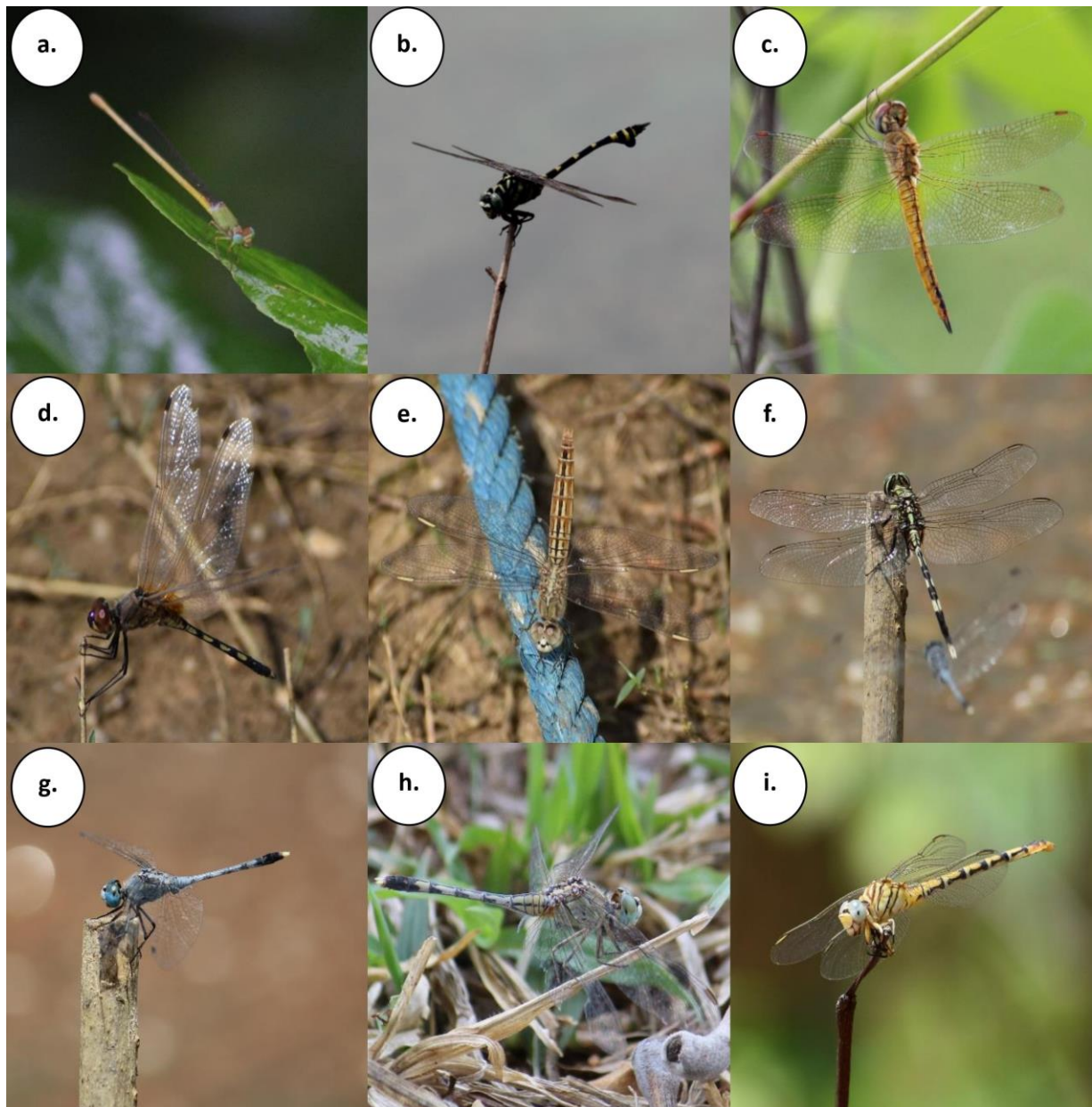
**Figure 1: Odonata diversity in Jamtara Forest Division, Jamtara, Jharkhand**



**Figure 2: Ditch jewel dragonfly in obelisk posture to prevent themselves from overheating on a hot sunny day**



**Figure 3: Threat of water pollution to the habitat of Odonates**



**Plate 1: Some common Odonates found in Jamtara Forest Division, Jharkhand; a) Coromandel marsh dart, b) Common clubtail, c) Wandering glider, d) Long-legged marsh glider, e) Ditch jewel, f) Green marsh hawk, g) Ground skimmer (Male), h) Ground skimmer (Female), i) Common hooktail**

### CONCLUSION

The present study concludes that less work is done on the study of Odonata diversity, their habitat, and their ecological aspects in Jharkhand state, India. Therefore, the present study highlights the importance of documentation of minor fanal species like dragonflies and damselflies. The documentation of such species will be helpful in making conservation plans. About 30 species of odonate are reported from Jamtara Forest Division, Jamtara, Jharkhand, and the study indicates that there is a need for conservation of water bodies and local flowering plants. Further, there is a need to fill the knowledge gaps about the life history,

distribution, and threats to odonates and develop recovery and management plans to protect their habitat and population.

### ACKNOWLEDGEMENT

Authors are thankful to the field staffs and local communities.

### REFERENCES

- Ajinkya BD, Mishra S and Kumar S. (2023a). Wild leafy vegetables used by tribals of Jamtara Forest Division, Jharkhand, India. *Journal of Biodiversity and Conservation*. 7(2): 6-17.
- Ajinkya BD, Rout S and Kumar S. (2023b). Moths of Jamtara Forest Division, Jamtara, Jharkhand, India. *Journal of Biodiversity and Conservation*. 7(2): 45-51.
- Babu R and Nandy S. (2014). Eight new records of dragonflies from Jharkhand State, India (Odonata: Aeshnidae, Gomphidae, Libellulidae). *Notulae odonatologicae*. 8(4): 91-93.
- Bomphrey RJ, Nakata T, Henningson P and Lin HT. (2016). Flight of the dragonflies and damselflies. *Philosophical Transactions of the Royal Society B*. 371: 20150389 DOI: 10.1098/rstb.2015.0389.
- Edgehouse M and Brown CP. (2014). Predatory luring behavior of Odonates. *Journal of Insect Science*. 14: 146. DOI: 10.1093/jisesa/ieu008.
- Hazra M, Hazra T, Sarkar SK, Bera S and Khan MA. (2020). First fossil dragonfly from India. *Current Science*. 119(7): 1204-1207.
- Kumar S and Devidas AB. (2023). Biodiversity assessment in Jamtara Forest Division, Jharkhand. Pp 1-21.
- Kumar S. (2023). Medicinal wealth of Jamtara Forest Division, Jamtara, Jharkhand. *Journal of Biodiversity and Conservation*. 7(2): E1-E2.
- Mishra S, Ajinkya BD and Kumar S. (2023a). Carnivorous plants of Jamtara Forest Division, Jharkhand, India. *Journal of Biodiversity and Conservation*. 7(2): 27-35.
- Mishra S, Ajinkya BD and Kumar S. (2023b). Wild edible fruits consumed by the Santal community in Jamtara Forest Division, Jamtara, Jharkhand. *Journal of Biodiversity and Conservation*. 7(2): 36-44.
- Mishra S, Ajinkya BD and Kumar S. (2023c). A note on *Yamazakia pusilla* (Willd.) from Jamtara Forest Division, Jamtara, Jharkhand, India. *Asian Plant Research Journal*. 11(4): 43-46.
- Nair MV. (2011). *Dragonflies & Damselflies of Orissa and Eastern India*. Wildlife Organization, Forest & Environment Department, Government of Orissa, India. pp 1-252.
- Pelli A. (2019). The life of dragonflies: order Odonata. *Ciencia e Natura Biologia-Ecologia*. 41(43): 01-07.
- Rout S, Ajinkya BD and Kumar S. (2023). Butterfly diversity of jamtara Forest Division, Jamtara, Jharkhand, India. *Journal of Biodiversity and Conservation*. 7(2): 18-26.
- Sajan SK, Patel JR, Bakshi MK, Singh AK, Kazmi SHE, Mishra AK and Anand P. (2014). Diversity and abundance of Odonata in Palamau Tiger Reserve, Jharkhand, India. *Pelagia Research Library*. 5(6): 126-131.
- Siddique N. (2019). *Dragonflies & damselflies in & around Delhi: a field guide*. Dorling Kindersley Publishing Private Limited, New Delhi, India. pp 1-143.
- Stoks R and Aguilar AC. (2012). Evolutionary ecology of Odonata: a complex life cycle perspective. *Annual Review of Entomology*. 57(1): 249-265.