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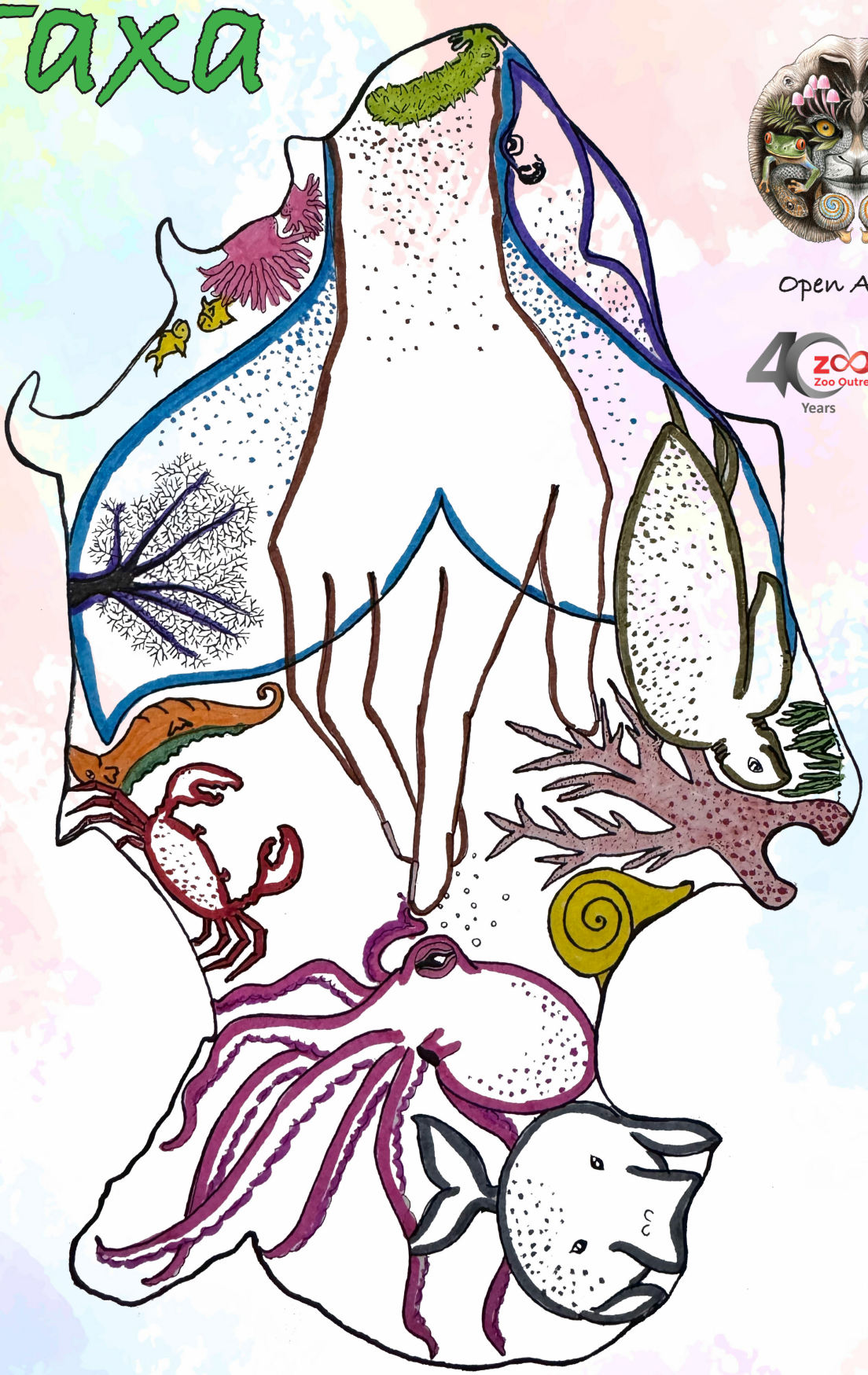

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continued on the back inside cover

Cover: Little Andaman is part of the island chain with incredible biodiversity, but these amazing species are threatened by development projects, and need our support. Pen and ink artwork by Priyanka Iyer.

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COMMUNICATION

First record of the *Coeliccia svihleri* Asahina, 1970 (Odonata: Platycnemididae) in Arunachal Pradesh, India

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Abstract: This communication reports the first confirmed sighting of *Coeliccia svihleri* Asahina, 1970 in Arunachal Pradesh, India, based on photographic evidence collected in the presence of forest personnel at Deban in the Namdapha Tiger Reserve during October 2024. Environmental conditions in the region that may support the presence of this species are discussed, with an emphasis on the potential impact of climate change on species distribution and habitat stability. The discovery of *C. svihleri* adds a significant new record to the biodiversity of the region, outlining the further need for continuous monitoring and habitat conservation for sustaining in-situ biodiversity.

Keywords: Biodiversity, conservation, damselfly, discovery, environment, habitat, Namdapha National Park, in-situ, species.

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Author details: Mahesh R. holds a master's degree in botany, with over 12 years of experience studying Lepidoptera. His expertise is often sought during the biodiversity surveys with the Kerala Forest Department. With three publications on moths, he remains committed in advancing biodiversity research and conservation. He is also regularly engaging students through lectures and workshops. Dr Rajesh Gopinath is an award-winning researcher with 25 international indexed publications, 56 citations, 13 book chapters, two handbooks, two textbooks, nine funded projects and 46 expert talks. He has been part of 18 ecological surveys and has discovered at least 4 species as first record to a state. Shri Gaurav Joshi is a young naturalist based in Uttarakhand. Blessed with a curious and observant nature, he is deeply interested in the natural world particularly in observing and documenting birds, insects, particularly butterflies. He is credited for re-discovering the *Rapala tara* (Assam Flash) after 110 years from the state of Uttarakhand. Shri Roshan Upadhaya serves with the Arunachal Pradesh Police Department, and has made significant contributions to butterfly research. His work includes several notable discoveries of rare and new species. Actively engaged in field surveys and conservation initiatives, he often collaborates with researchers and institutions, to strengthen knowledge on Lepidoptera diversity in northeastern India.

Author contributions: Mahesh R: Sighting; Conceptualization; writing-original draft; formal analysis; methodology; draft preparation, review & editing; Rajesh Gopinath: visualization; writing, final review and editing Gaurav Joshi: formal analysis; investigation. Roshan Upadhaya: project administration; supervision.

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INTRODUCTION

Odonata, comprising both dragonflies and damselflies, are among the most ancient and ecologically significant insect orders (Corbet et al. 2006). Characterized by their large compound eyes, striking colours, and agile flight, these insects play a vital role as apex predators in freshwater and humid forest ecosystems, helping regulate insect populations and serving as indicators of environmental health (Gopinath et al. 2022). Worldwide diversity of odonates has been evaluated at 6,430 species classified in 823 genera (Paulson et al. 2025a) of these 493 species & 27 subspecies in 152 genera and 18 families are known to exist in India (Subramanian et al. 2020). Just like Lepidoptera, sadly many of the Odonata species are also under the threat of extinction due to emerging climate change induced modifications, and habitat loss owing to rampant development and inorganic urbanisation (Aadarsa et al. 2021).

Odonata inhabit a wide range of aquatic environments, including ponds, streams, rivers, and wetlands (Dijkstra et al. 2014). Damselflies, belonging to the suborder Zygoptera, are particularly known for their slender bodies, and delicate wings (Dijkstra et al. 2014). The Platycnemididae family of damselflies, also known as river damselflies, comprises over 400 species typically found in tropical, and subtropical freshwater habitats such as streams, rivers, and wetlands (Selys-Longchamps 1863; Allen et al. 1985; Dijkstra et al. 2014). These damselflies are characterized by distinctive wing morphology, which include flat or rounded tips. They are also known for their vibrant colour patterns, often featuring shades of blue, green, or yellow (Corbet et al. 2006). The genus *Coeliccia* is characterized by a slender, cylindrical abdomen, hyaline wings with rounded apices, and striking colour patterns, often with black bodies and blue, yellow, or chrome-yellow markings. The species in this genus are typically distinguished by the morphology of their wings and the structure of their anal appendages, which are used for species identification (Selys-Longchamps 1863; Kirby 1890).

This genus comprises 79 species globally (Paulson et al. 2025b), with 13 species recorded in India (Subramanian 2014). Among these, only four have so far been documented from the state of Arunachal Pradesh. These include *Coeliccia bimaculata* Laidlaw, *C. prakritik* Lahiri, *C. renifera* Selys, and *C. didyma didyma* Selys (Mitra et al. 2010).

Study Area

Namdapha National Park and Tiger Reserve, located in the Changlang District of Arunachal Pradesh, India, spans an area of approximately 1,985 km² and is one of the largest protected areas in the eastern Himalaya (Arunachal Online 2024). Situated at the convergence of the Patkai Range and the Dapha Bum Ridge of the Mishmi Hills, the park lies between 27.383°–27.650° N and 96.250°–96.967° E (Arunachal Online 2024). Figure 1 depicts the location of Namdapha Tiger Reserve in Arunachala Pradesh, India. The park's diverse topography includes tropical rainforests, subtropical forests, and alpine meadows, with elevations ranging from 200 m to over 4,571 m (Image 1). The region experiences a subtropical climate with significant variation in weather conditions at different elevations. Extending up to an area of 2,052.82 km², the species composition of Namdapha is also hence rich, thick, and diverse (www.arunachalonline.in). This diversity of habitats, along with its rich flora and fauna, makes Namdapha an important part of the Indo-Burma biodiversity hotspot. The park is also home to several endangered and endemic species, such as the Snow Leopard, Clouded Leopard, and Asian Elephant (Choudhury 2013). Deban, one of the key study locations within Namdapha National Park, is characterized by dense tropical rainforests with a variety of evergreen tree species such as *Dipterocarpus*, *Shorea*, and *Castanopsis*, along with bamboo groves, and diverse riverine ecosystems along the Noa-Dihing, and Namdapha Rivers (Sathyakumar et al. 2011).

METHOD

While Namdapha National Park has been a study area for periodic and regular lepidopteran surveys since 2018, attention is still sparse towards Odonata studies. A supervised-exploratory exercise was undertaken during October 2024 to document the Odonata species present in the region, with a particular focus on the identification and observation of species not previously recorded in the area.

The walks were carried out along trails and riverbanks within the park, with special attention paid to the rich wetland and stream habitats that are ideal for damselflies. The study to document the Odonata abundance and diversity was undertaken in the presence of authorised experts and forest personnel. The species identification was done by consulting experts (mentioned in the acknowledgement), and analysing the ID keys (Asahina 1970). Nikon D3300 DX-format DSLR Kit w/ 18–55mm DX

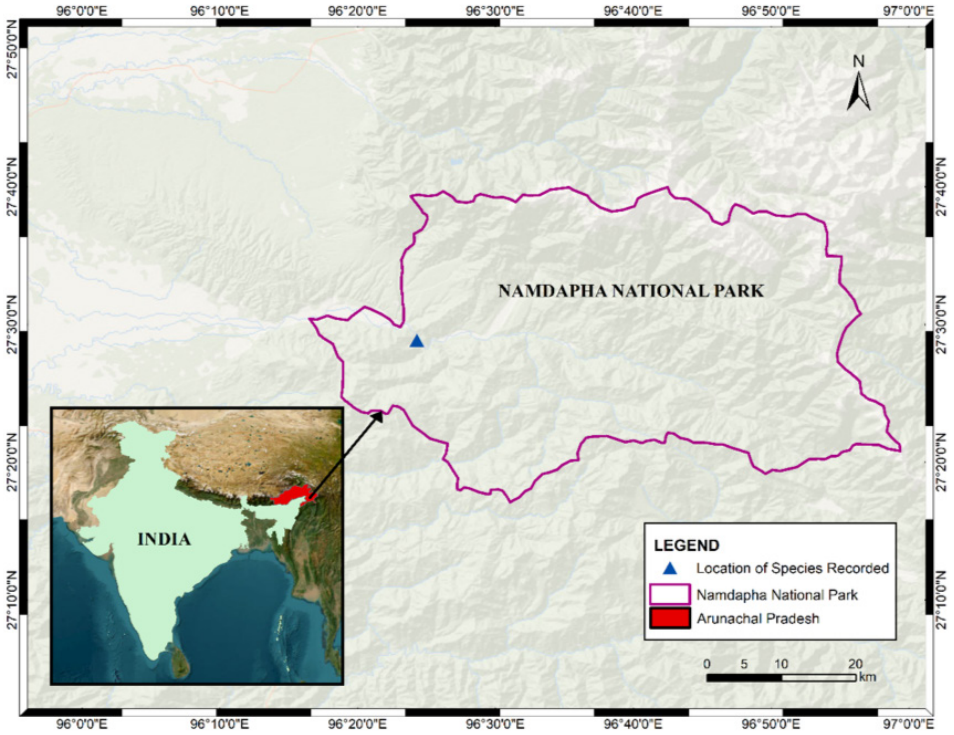

Figure 1. Location of Namdapha Tiger Reserve in Arunachala Pradesh, India. © Mahesh R.

Image 1. Representative image of Namdapha Tiger Reserve. © Nisha Gopinath.

VR II, Sony Cyber-shot DSC-RX10 IV Digital Camera RX10 Mark IV with 0.03s. AF/25X optical zoom, and Nikon Z50 compact mirrorless digital camera with 50–250 mm lens were utilised in this exercise.

RESULTS AND DISCUSSION

The present study has resulted in the sighting of 21 species, with confirmation of ID accomplished for about 16 species. The species observed during the exploration included *Trithemis aurora*, *Neurothemis fulvia*, *Orthetrum glaucum*, *Echo margarita*, *Cephalaeschna*

sp., *Aristocypha spuria*, and *Neurobasis chinensis*. Species such as *Trithemis aurora* and *Neurothemis fulvia* were found in good numbers in the vegetation, while *Aristocypha, Echo*, and *Neurobasis* spp. were predominantly observed near streams, and riverine habitats. A mating couple of *C. didyma* (Selys, 1863) was also observed (Image 2). These observations highlight the diverse Odonata fauna present in the forest and the persistent need for further research to assess species distribution and ecological roles.

On 14 October 2024, at approximately 1100 h, a single 'male' individual of *Coeliccia svihleri* was observed resting in a shaded area along the trekking path on the Miao to Vijaynagar road. The species was identified from plates based on its distinct morphological features ably supported by the multiple-angled photographs taken (Image 3–9). The importance of this discovery highlights the first ever recorded verifiable sighting of *C. svihleri* in Namdapha National Park and Arunachal Pradesh. The identification was confirmed based on the morphological characteristics. The findings underscore the need for continued monitoring and documentation of Odonata biodiversity in this ecologically significant and sensitive zone.

Image 2. Mating individuals (male-top & female-bottom) of *Coeliccia didyma*. © Gaurav Joshi.

Systematic Position

Order: Odonata Fabricius, 1775
Suborder: Zygoptera Rambur, 1842
Family: Platycnemididae Selys, 1863
Genus: *Coeliccia* Selys, 1853
Coeliccia svihleri Asahina, 1970

Identification Features (Asahina 1970)

A slender species with paired round mesopleural spots and pointed superior caudal appendages. The labrum is black with a distinctly pale yellowish anterior border, the anteclypeus is zinc blue, and the postclypeus is shining black. The antefrons is black with a pale lower border, while paired pale spots are present near the lateral ocelli and one on the postfrons. The prothorax is black, and the pterothorax has broad black markings with paired elliptical yellow spots on the lower mesepisternum. Abdomen segments 1–8 are black dorsally, with small pale areas on segments 1, 3–5, while segments 9, and 10 are dark yellow with a minute black scar at the base of segment 9. The caudal appendages are dark yellow, with superiors pointed laterally, flattened dorsally, and bearing a median projection directed inward.

Image 3. Photograph of *Coeliccia svihleri* (male) individual from the Namdapha Tiger Reserve. © Mahesh R.

Scope of Discovery

While the primary objective was to enhance the

Image 4. Photograph of *Coeliccia svihleri* (male) individual from the Namdapha Tiger Reserve. © Mahesh R.

Image 5. Photograph of *Coeliccia svihleri* (male) individual from the Namdapha Tiger Reserve. © Mahesh R.

Image 6. Close-up feature of the photographed male individual from the Namdapha Tiger Reserve. © Gaurav Joshi.

known distribution of Odonata species in Namdapha Tiger Reserve, the current manuscript majorly highlights about the discovery of *C. svihleri*. This finding represents a significant contribution to the understanding of Odonata biodiversity in Arunachal Pradesh, an area that remains underexplored in terms of its damselfly fauna. This confirmed record of *C. svihleri* extends the known distribution of this species within India and adds a valuable data point for the region's Odonata inventory. The sighting in Namdapha, therefore, not only fills a gap in the geographical distribution of *C. svihleri* but also strives to highlight the rich and largely undocumented biodiversity of the park. Notably, this is not only the most recent verified observation from India since 2002, but also most probably the third (research/evidence-based) photographic verifiable record ever from India.

Habitat and Ecological Significance

The habitat in which *C. svihleri* was observed are shaded areas (Image 10), besides streams, riverbanks; thereby aligning with the typical ecological requirements of *Coeliccia* species, which are known to inhabit freshwater habitats such as streams, rivers, and wetlands (Selys-Longchamps 1863; Dijkstra et al. 2014). Namdapha's diverse topography, with its range of riverine and riparian ecosystems, provides an ideal habitat for such species. The presence of lush tropical and subtropical rainforests at lower elevations, transitioning into alpine meadows at higher elevations, offers a mosaic of microhabitats that support a wide variety of Odonata species. The observation of *C. svihleri* in this

environment suggests that the park's water systems, particularly those along the Noa-Dihing and Namdapha rivers, may serve as important refugia for *Coeliccia* species. These riverine ecosystems, characterized by high humidity, stable temperatures, and rich aquatic vegetation, are conducive to the breeding and feeding behaviours of many damselfly species. As such, the sighting of *C. svihleri* further underscores the importance of conserving these fragile aquatic ecosystems within Namdapha National Park.

Biodiversity Implications and Conservation Concerns

C. svihleri Asahina is designated by the IUCN Red List assessment of 19 March 2018 as 'Least Concern' (Dow 2019). Yet information on its abundance and distribution is sparse. This could be either due to under-reporting or mis-identification.

This discovery hence highlights the need for further taxonomic and ecological studies of *C. svihleri* and other Odonata species present in the region. Despite their ecological importance as both predators and prey in freshwater habitats, Odonates remain relatively understudied in many parts of India, including the northeastern states. The region's diverse climatic conditions and topographic features make it an important hotspot for studying species distribution and ecological dynamics in response to climate change, and habitat loss. The presence of *C. svihleri* in Namdapha National Park may also be indicative of global environmental trends, particularly in relation to climate change (Olsen et al. 2022). Shifts in climate inducing extreme temperature, and erratic precipitation, could not only affect the habitat suitability, but its life cycle as well (John et al. 2023). Hydrological changes, including fluctuating river flow patterns, increased frequency and intensity of floods or droughts, may also alter the quality of the riverine, and wetland habitats that these Odonata species heavily rely on especially for their reproduction, and survival (Van et al. 2023).

Consequently, further monitoring is needed to track the species' population dynamics and range expansion, especially considering predicted climate-related disruptions. Additionally, while Namdapha is well-protected as a national park, continued conservation efforts are essential to ensure the preservation of its diverse habitats. Human-induced pressures such as deforestation, forest fragmentation, and encroachment on riparian zones pose ongoing threats to the park's biodiversity. Monitoring the health of its freshwater ecosystems will be critical in mitigating these threats and safeguarding species like *C. svihleri*. Any species which is

Image 7. Close-up feature of the photographed male individual from the Namdapha Tiger Reserve. © Roshan Upadhaya.

Image 8. Close-up feature of the photographed male individual from the Namdapha Tiger Reserve. © Rajesh Gopinath.

sparsely documented, due to lack of credible knowledge of their life cycle, can invariably lead to extinction of the local populations (Chen et al. 2011). Hence, more focussed and habitat-specific explorations need to be indulged in towards the conservative approaches for these sensitive bio-indicator species (Fourcade et al. 2021).

Comparison with Previous Records

Worldwide, *C. svihleri* has been scientifically and systematically documented (to-date) from Bhutan, China (Yunnan), India (Assam), and Myanmar (mainland). This species was reported in 1991 and 2000 from Myanmar (Tsuda 1991; Tsuda 2000). The latest presence for it has been recorded in 2019 from Yunan, China (Zhang 2019).

The only records of *C. svihleri* in India are from regions located within the state of Assam, in Ledo and Kameng (Asahina 1970); in Abhoypur Forest and Naphuk (Asahina 1985). While Assam is a neighbouring state

Image 9. Close-up feature of the photographed male individual from the Namdapha Tiger Reserve. © Rajesh Gopinath.

of Arunachal Pradesh, what is noteworthy to mention here are that the geographical regions that they have been spotted is at least aerially 161–285 km away from Namdapha National Park. The finding of *C. svihleri* in Arunachal Pradesh extends its known range beyond Assam, where it was first described by Asahina in 1970. The species' distribution in India, therefore, appears to be more extensive than previously thought, potentially indicating a wider ecological tolerance or the presence of under-explored habitats.

This new finding / sighting from the eastern Himalaya suggests a more complex biogeographical history for this species, potentially linking to the region's unique climatic conditions and its status as part of the Indo-Burma biodiversity hotspot. The sighting of *C. svihleri* in Namdapha National Park also emphasizes the potential for discovering additional, as-yet-undocumented Odonata species from this Tiger reserve. Given its diverse habitat types and the limited number of surveys conducted to date, it is highly likely that other rare or new species may yet be discovered, further enriching the biodiversity profile of this ecologically significant area.

Image 10. Typical habitat of discovery (Miao to Vijaynagar road). © Nisha Gopinath.

CONCLUSION

This study presents the first record of *C. svihleri* from Arunachal Pradesh, significantly contributing to the known distribution of this species in India. This discovery serves as an addendum to existing inventory and hence is critical for deciphering the ecosystem dynamics, for regauging conservation strategies. Thereby the sighting underscores the need for continued surveys and research on Odonata in Namdapha National Park since the region remains relatively under-explored in terms of its dragonfly and damselfly fauna. Given the ongoing environmental changes in the region, including potential shifts in climate, further monitoring of species distribution is essential. This discovery adds valuable information to the biodiversity inventory of Namdapha and highlights the importance of conserving the park's rich ecological heritage. Further studies could delve upon the need for periodic explorations towards understanding the life cycle and time-based distribution map of this species.

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