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Odonata assemblage at a small garden near Harsul lake (Aurangabad city)

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Abstract:

During a study done from December 2021 to April 2022, 5 Odonata species belonging to 5 taxa, 3 families, and 2 suborders were gathered from a fairly limited area of Harsul Lake Garden Aurangabad city. The Ashnidae family has the species (2), followed by the Coenagrionidae family (1 species), and the Libellulidae family (2 species).

Keywords: Assemblage, Diversity, Harsul lake garden, Odonata.

Introduction:

Odonates are generally the main predators in aquatic ecosystems since they are a flagship group. Odonates can be found in almost every type of freshwater habitat on the planet. Though the majority of the species are habitat-specific, some exploit man-made water bodies and have adapted to urban environments. They are a good biological indicator of environmental changes due to their sensitivity to environmental variables. (Brown K. 1991). Odonata can be found in a wide variety of environments, from permanent running streams and lakes to small transient rain ponds. Adults are visible, easy to record, well-studied taxonomically, and vulnerable to habitat changes caused by human activity. (Brown K. 1991). With 5,952 species globally, the order Odonata is quite large, with 474 species in 142 genera and 18 families found in India. The Western Ghats of India is extremely diverse, with over 174 species, including 56 endemics. (Prasad M et, al. 2000).

Numerous pieces of literature on taxonomic information on Odonata of India and the Western Ghats, which include, have been published in recent years. Kulkarni and Subramanian have published an account of the odonates of Maharashtra's Mula-Mutha river basins. (Kulkarni AS et, al. 2013). The goal of this study is to look at the variety and richness of Odonata assemblages in a tiny, disturbed habitat in the heart of Aurangabad, which is a highly urbanized city. As a result, it will be easier to assess the critical ecological conditions that promote Odonata variety and richness.

Materials and Method:

On the western fringe of the Deccan plateau, Aurangabad city (Maharashtra, India) is approximately 568 meters above sea level. The study area is a little garden near a lake (19.9282° N, 75.3368° E) in Harsul, Aurangabad, Maharashtra, with an area of around 500 sq. m adjacent to a lake (Fig-I). The study location is surrounded by a lake. The results reported here are based on field surveys and investigations conducted by random sampling method throughout the months of December, January, February, March, and April in the year 2021-2022. Photographs of odonates were taken with a point-and-shoot camera.

Odonata key identification was used to identify the specimens that were photographed. Specimens with suitable labels containing their scientific names and details about specimens with the date of the collection were properly stored in the laptop after identification. The field has been recognized. The number of species seen was recorded in a field notebook and the time and date.

Fraser and Subramanian gave identifying keys that were used to identify the Photograph specimens. (Fraser FC et, al. 1993). Subramanian's Odonata taxonomy and binomial names were followed. After Fraser and Subramanian, the diagnostic characters for identification are used. (Fraser FC et, al. 1993). Some of the specimens have been photographed and are available for viewing. The abundance of Odonates in the study area was classified (as Very common, Common, or Rare). (Tiple AD et. al. 2012).

JB Aghade SA Saraf

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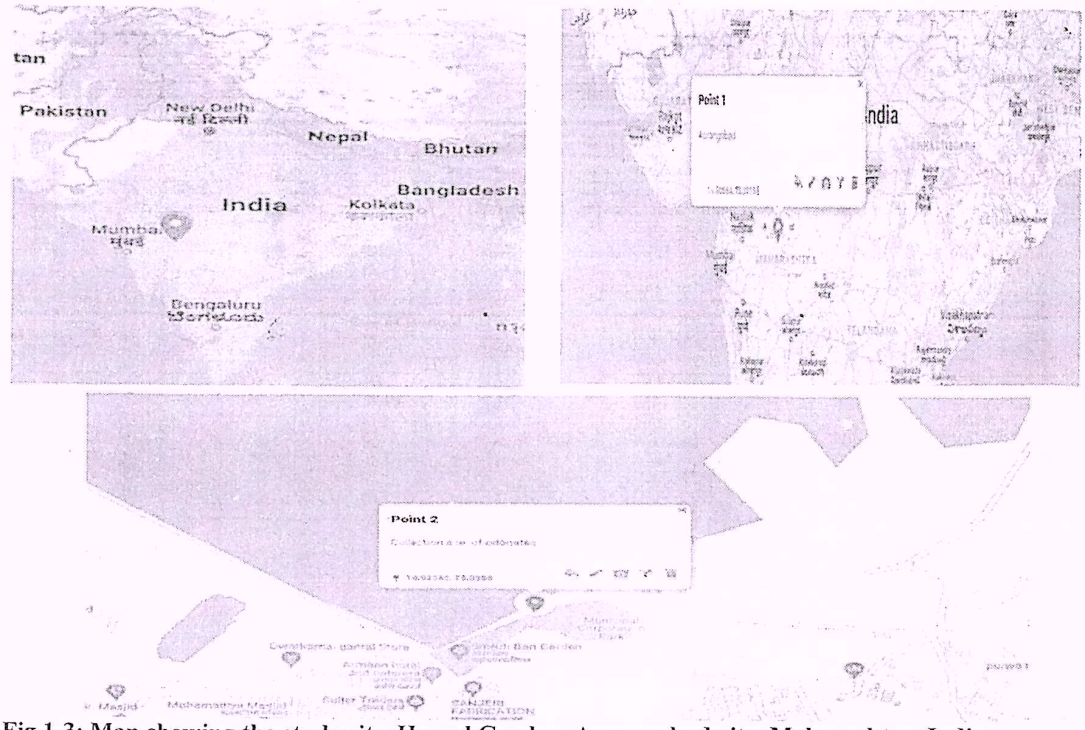

Fig 1-3: Map showing the study site, Harsul Garden, Aurangabad city, Maharashtra, India.

Results:

A total of 53 Odonates were discovered. The current investigation discovered 5 Odonate species belonging to 5 genera, 3 families, and two suborders.

Systematic Account:

Order: Odonata

Sub Order: Anisoptera

Family: Aeshnidae

Genus: Aeshna

Aeshna affins

Description: Hawker is a little migratory species, Blue eyes, male. Blue patterns on a dark abdomen. Brown eyes, female. The abdomen is brown with yellow streaks.

Latin Name: *Aeshna affinis*

Habitat: Often seen hawking along reedy, wet ditches. In its natural Mediterranean habitat, it breeds in standing water.

Status & Distribution: The Southern Migrant Hawker has been nesting in the Estuary since 2010. Migrant influxes have been more common in recent decades, with the majority of sightings originating from the southeast coast and Asia.

Similar Species: Other Hawker species may cause confusion, Southern Migrant Hawker can be distinguished by its: Colouration,Segment 2 has a distinct triangle marking On the back of the thorax, there are few antehumeral marks.

Identification Notes: 60mm in length, Down the abdomen, paired dots, Segment 2 has an elongated triangular marking and on the back of the thorax, there are little antehumeral marks.

Genus: Anax

Anax imperator:

Description: The largest Dragonfly in the UK and Asia.Male: Sky blue abdomen with a dark line running through it.Female: Green abdomen with a dark line running down the middle. A blue abdomen is occasionally seen.

Latin Name: *Anax imperator*

Habitat: Large, well-vegetated ponds and lakes are the most common habitats, but canals and slow-moving rivers can also be found.The female lays her eggs on floating pondweed by herself.

Status & Distribution: It can be found all over the world, including most of England; its range has expanded dramatically during the 1990s. The species has been recorded in Scotland since 2003, and it can be found along the southern and eastern coasts of the country, as well as in Asia.
Similar Species: May be confused with other Hawkers.Can be differentiated by its: Large dimensions, Abdomen drooping (in flight) and colours of bright blue and green.
Identification Notes: 78mm in length, Costa in bright yellow (leading wing vein).Thorax is apple-green. Eyes that are green or blue, the dark line runs down the center the abdomen, It rarely lands and even eats its prey while in flight and they frequently fly with their backs curved slightly downward
Family: Libellulidae
Genus: Orthetrum
Orthetrum cançellatum:
Description: A dragonfly of medium size with a tapering abdomen.Males have a blue and black abdomen that darkens toward the back. Females have a yellow abdomen with a dark ladder pattern.
Latin Name: ***Orthetrum cancellatum***
Habitat: Favours open water and bare spots near the coast in lakes, slow rivers, ponds, and occasionally marshy areas. Male patrollers frequently take a break in the sun on bare ground.
Status & Distribution: In southeast England, it's quite frequent. Since the late 1980s, this species has expanded rapidly in both the UK and Asia, however, it was only discovered in Scotland in 2006.
Similar Species: Yellow pterostigma on Keeled Skimmer is not dark, the abdomen of males is not darkly colored, instead of the ladder pattern, females have a thin black line running down the center of their abdomen and Chaser Black costa (not yellow) is rare.
Identification Notes: 44-49 mm in length, the cost of the wings is yellow (leading wing vein), Pterostigma dark (wing spots), females and immature adults are similar and they skim the water's surface, flying quickly and low.
4] *Orthetrum coerulescens*:
Description: Dragonfly with a prominent dorsal keel (dark line down the middle of the back).
Male with blue-grey eyes and a blue body. female features include an orange abdomen and brown eyes.
Latin Name: *Orthetrum coerulescens*
Habitat: Wet heathland habitats with pools and streams are preferred. At such locations, it may be found resting low in the heather.
Threats: Unpredictable rainfall due to climate change and Pollution removal and drainage.
Status & Distribution: The species has a patchy distribution over Asia, but is more frequent in the west. Since 1990, in India.
Similar Species: Similar to the Black-tailed Skimmer and the Scarce Chaser. The Paler Wing Spots of the Keeled Skimmer differentiate it. costa in yellow (leading wing vein), On the rear of the thorax, there are faint antehumeral stripes and keel black.
Identification Notes: 40-44mm in length, The abdomen is slim, with a prominent dorsal keel (dark line down the middle of the back), Costa in yellow (leading wing vein), Pterostigma, yellow or brown (wing spots), On the rear of the thorax, pale ante-humeral streaks, Females and immature adults are similar. The wings are frequently yellow in color and the wings are frequently held forward when at rest.
Order: Odonata
Sub Order: Zygoptera
Family: Coenagrionidae
Genus: Ceriagrion
5] *Cerigrion tenellum*:
Description: Reddish legs, eyes, and wing markings distinguish this species from the other two red Damselfly species. Male: Red abdomen and black thorax. Female: Red/black abdomen and black thorax.
Latin Name: *Ceriagrion tenellum*
Habitat: bogs in southern India and west Bangladesh have shallow pools, seepages, and streams.
Threats: Habitat loss and fragmentation, as well as changes in hydrology such as drainage that diverts water away from existing seepages and flushes. Plant succession and invasion wreak havoc on unmanaged areas.
Status & Distribution: The World Odonata Red List 2008 lists it as Nationally Scarce.
Similar Species: Red Damselfly with Black Legs, Larger. On top of the thorax, black pterostigma (wing dots) and larger coloured antehumeral stripes.
Identification Notes: Redlegs, 31mm in length, thorax bronze-black on top and pale yellow on the side, red pterostigma (wing dots). Red abdomen in males and Erythrogastrum females have a completely red

JB Aghade SA Saraf

abdomen. The red and black abdomen of the Typica form. The abdomen of the Melanogastrum form is black.

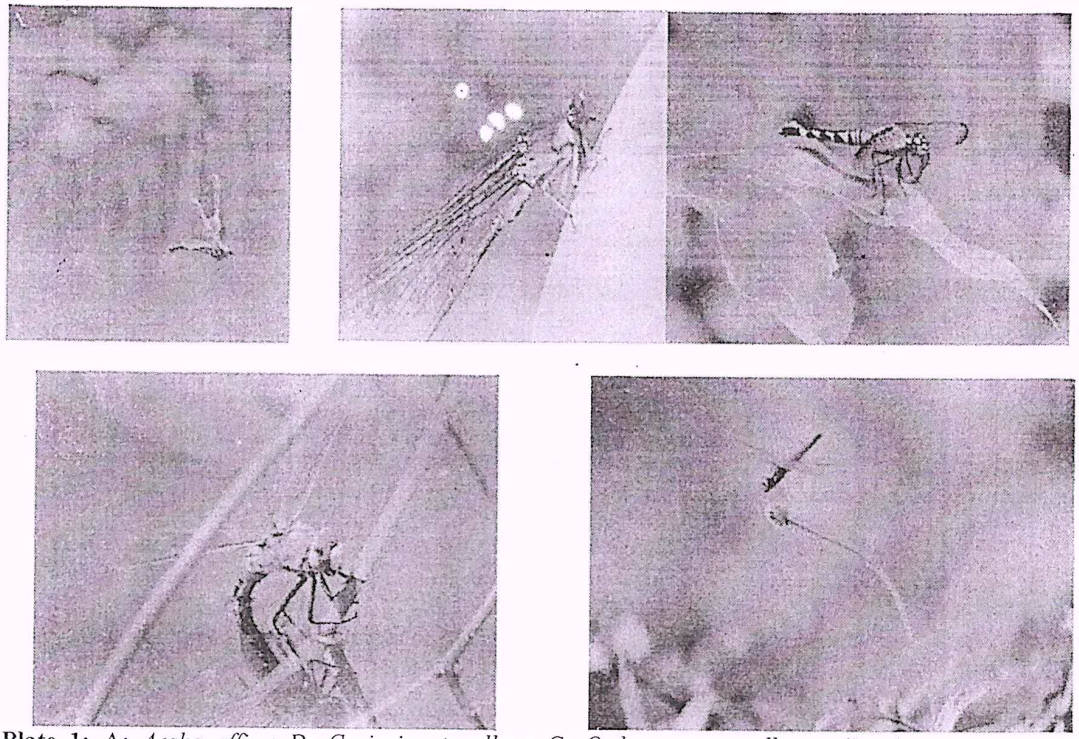

Plate 1: A: *Aesha affins*; B: *Cerigrion tenellum*; C: *Orthetrum cancellatum*; D: *Anax imperator*; E: *Orthetrum coerulescens.*

Table 1: Odonates from the research area: taxonomic composition, occurrence, and seasonal variation.

Sr. No.	Species	Family	Sampling Data					
			Actual Photograph			Observed Data		
			Dec.-Jan (Post-monsoon)	eb.-Mar. (Post-Monsoon)	April (Summer)	Dec.-Jan (Post-monsoon)	eb.-Mar. (Post-monsoon)	April (Summer)
1	*Aeshna affins*	Aeshnidae	1			2		
2	*Anax imperator*	Aeshnidae	1	1	1	2	6	2
3	*Orthetrum cancellatum*	Libellulidae		1		2		
4	*Orthetrum coerulescens*	Libellulidae		1	1		7	2
5	*Cerigrion tenellum*	Coenagrionidae		1			20	2
Total number of Individuals			2	4	2	6	33	6

Table 2 shows the abundance of Odonata in the study area.

Sr. No	Family	Species	Status
Suborder: Anisoptera (Dragonflies)			
1	Aeshnidae	*Aeshna affins*	Rare
2	Aeshnidae	*Anax imperator*	Very Common
3	Libellulidae	*Orthetrum cancellatum*	Common
4	Libellulidae	*Orthetrum coerulescens*	Common
		Suborder: Zygoptera (Damselflies)	

JB Aghade SA Saraf

5	Coenagrionidae	*Cerigrion tenellum*	Very Common

Discussion: The water at the research site is perennial and covered in floating macrophytes. Animal excreta, plastic bottles, brick and cement wastes, and other degradable and non-degradable contaminants pollute the water. Dragonfly habitat selection involves three steps: biotope selection, habitat selection, and oviposition site selection. (Corbet PS. 1999). For some environments, macrophytes play an important role in determining Odonata assemblages (Clark TE et, al. 1996).

Conclusion:

This research shows how a modest man-made ecosystem in the center of a highly industrialized city may support a significant portion of the species variety on a broader scale. It is a source of concern that urban and industrial expansion in Aurangabad is destroying Odonate habitat. This small section of stagnant water in a lake has an abundance of Odonates, forming a small hotspot. Because they support a good aggregation of aquatic/semi-aquatic insects, these small hotspots should be maintained and kept pollution-free across the city limit.

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