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Odonate Diversity in Selected Habitats of Sringeri Taluk, Chikmagalur district

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Abstracts: *Dragonflies and Damselflies, collectively called Odonates and are one of the most common insects flying over forests, fields, meadows, ponds and rivers. Few streams, ponds, marshes, swamps and hilly green areas with lesser disturbance of humans were selected for the present study. Transect method was employed for the present study. A line transect of 500m length was laid in ten selected study areas and the odonates observed along the transects were documented and photographed. The diversity and abundance of the documented species of dragonflies and damselflies were measured and the Shannon and Simpson's diversity indices were calculated using the standard formulae available. 52 species belonging to 28 genera and 10 families are documented in the present study. Out of these 29 are Anisopterans (Dragonflies) and remaining 23 are Zygopterans (Damselflies).*

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I. Introduction

Dragonflies and damselflies collectively called Odonates, are one of the most common insects flying over forest, fields, meadows, ponds and rivers. About 5,000 species of odonates are found throughout the world. In India about 500 species and subspecies are reported (1). The extant dragonflies are divided into two suborders, the Zygoptera (damselflies) and the Anisoptera (dragonflies). Until recently a third suborder, Anisozygoptera, was recognized with two extant species from Japan and the eastern Himalayas (2). The Odonates are amphibiotic insects. They spend a major part of their life cycle in fresh water ecosystem. The adults are generally predacious insects, while the larvae are carnivores and voracious. Even though the species are usually highly specific to a habitat, some have adapted to urbanization and use man-made water bodies (3). The life history of odonates is closely associated with wetlands. Adults lay eggs in specific aquatic habitats. The larvae which emerge from the eggs are predatory and they feed on diverse aquatic organisms such as small crustaceans, aquatic insects, tadpoles and small fish. Adult odonates usually emerge during late evening or early morning. Emerged odonates colonize landscape surrounding the wetland. Male odonates are generally more brightly coloured than females. Adults catch insects such as small flies, mosquitoes, butterflies and other small odonates in flight (4). Odonates are good indicators of environmental changes as they are sensitive to changes in the habitats, atmospheric temperature and the weather conditions. They are biocontrol agents; many species of odonates inhabiting agro ecosystems play a crucial role controlling pest population (5).

II. Materials And Methods

2.1Study area

The study areas come under the taluks of Sringeri and Tirthahalli which are amongst the famous tourism places of Karnataka. The place with hills and planes travelled by the holy river Tunga and its tributaries has bestowed rich diversity of flora and fauna which is well known for its vegetation, especially the medicinal herbs. The selected study areas include a few streams and pond, marshes, swamps, hilly green areas with lesser disturbance of humans.

2.2Field methods

Odonata study was carried out from the month of August 2016 to October 2016. Transect method was employed for the present study. A line transect of 500m length was laid in each of the study areas and the observed odonates along transect were documented and photographed. For photography, Nikon coolpix L340 and Nikon coolpix L40 cameras were used. Documented species were identified using standard manuals published earlier (13).

The frequency, density, abundance, SIV (Species Important Value), Shannon's and Simpson's diversity indices for all documented specie are calculated by using respective formulae (6, 7, 8).

$$\text{FREQUENCY} = \frac{\text{Number of transects in which the species occurred}}{\text{Total number of transects studied}}$$

$$\text{RELATIVE FREQUENCY} = \frac{\text{Frequency of a species}}{\text{Total frequency of all the species}} \times 100$$

$$\text{DENSITY} = \frac{\text{Total number of individuals of a species}}{\text{Total number of transects studied}}$$

$$\text{RELATIVE DENSITY} = \frac{\text{Density of a species}}{\text{Total density of all the species}} \times 100$$

$$\text{ABUNDANCE} = \frac{\text{Total number of individuals of a species in all transects}}{\text{Total number of transects in which the species has occurred}}$$

$$\text{Species Importance Value (SIV)} = \text{Relative frequency} + \text{Relative density}$$

SHANNON'S DIVERSITY INDEX= $H= \sum pi \ln pi$, where $pi= (ni/N)$

SIMPSON'S VALUE,$D = \sum ni(ni-1)/N(N-1)$

III. Result

A total of 52 species belonging to 28 genera and ten families are documented during the present study (TABLE1) (viz., Aeshnidae, Libellulidae and Gomphidae belonging to Anisoptera, Coenagrionidae, Protoneuridae, Euphaeidae, Calopterygidae, Platycnemididae, Lestidae and Chlorocyphidae belonging to Zygoptera). Out of which 29 are Anisopterans and remaining 23 are Zygopterans.

Among the listed species, *Pantala flavescens* was found to be the species with highest Species Importance Value (SIV) of 24.36, followed by *Diplacodes trivialis* (14.64), *Orthetrum sabina* (12.50), *Neurothemis fulvia* (10.68) and *Orthetrum chrysis* (9.99). Further, the most frequently distributed among the documented species was *Diplacodes trivialis* with a frequency value of 1.0, followed by *Orthetrum sabina* (0.90), *Pantala flavescens* (0.90), *Neurothemis fulvia* (0.80) and *Lathrecista asiatica* (0.70). Besides, among the listed species, *Pantala flavescens* was found to have the highest density value of 11.30, followed by *Diplacodes trivialis* (4.80), *Aciagrion occidentale* (4.00), *Pseudagrion microcephalum* (4.00) and *Orthetrum sabina* (3.90. Likewise, the most abundant of the listed species was found to be *Pseudagrion microcephalum* and *Aciagrion occidentale* with an abundance value of 40.00 each, followed by *Pantala flavescens* (12.56), *Rhinocypha bisignata* (10.00) and *Ceriagrion cerinorubellum* (6.40)

The diversity of odonates in these selected habitats is comparatively rich because it showed a Shannon's value of 3.13 and Simpson's value of 0.07.

IV. Conclusion

The present study focuses mainly on the diversity of odonates in selected habitats of Sringeri and Teerthahalli taluk. The diversity in these habitats is very rich when compared with the other available earlier published data. Only 34 species are documented from Gorewada International biopark (9), only 22 from Chatri Lake Region, in Pohara – Malkhed Reserve Forest, Amravati, Maharashtra (India) (10), 30 from Palamau Tiger Reserve, Jharkhand, India (11), 14 from Ankal village of Gulbarga and 34 from Kondajji lake, Davanagere (12).

However, in this study we focused a very small part of the selected geographical areas. Repetitive surveys and documentations which considerably minimize the errors are not carried out. More precise studies will definitely add potential results.

TABLE 1- List of Documented species

Common name	Scientific name	Family
Asiatic blood tail	*Lathrecista asiatica*	Libellulidae
Black marsh trotter	*Tramea limbata*	Libellulidae
Blue darner	*Anax immaculifrons*	Aeshnidae
Blue hawklet	*Hylaeothemis fruhstorferi*	Libellulidae
Blue marsh hawk	*Orthetrum glaucum*	Libellulidae
Blue tailed yellow skimmer	*Palpopleura sexmaculata*	Libellulidae
Brown backed red marsh hawk	*Orthetrum chrysis*	Libellulidae
Common club tail	*Ictinogomphus rapax*	Gomphidae
Crimson marsh glider	*Trithemis aurora*	Libellulidae
Crimson tailed marsh hawk	*Orthetrum pruinosum*	Libellulidae
Dancing drop wing	*Trithemis pallidinervis*	Libellulidae
Ditch jewel	*Brachythemis contaminata*	Libellulidae
Evening skimmer	*Tholymis tillarga*	Libellulidae
Fulvous forest skimmer	*Neurothemis fulvia*	Libellulidae
Granite ghost	*Bradinopyga geminata*	Libellulidae
Green marsh hawk	*Orthetrum sabina*	Libellulidae
Ground skimmer	*Diplacodes trivialis*	Libellulidae
Lesser blue wing	*Rhyothemis triangularis*	Libellulidae
Parakeet darner	*Gynacantha bayadera*	Aeshnidae
Picture wing	*Rhyothemis variegata*	Libellulidae
Pied paddy skimmer	*Neurothemis tullia*	Libellulidae
Pigmy skimmer	*Tetrathemis platyptera*	Libellulidae
Plain sinuate clubtail	*Burmagomphus laidlawi*	Gomphidae
Ruddy marsh skimmer	*Crocothemis servilia*	Libellulidae
Ruddy meadow skimmer	*Neurothemis intermedia*	Libellulidae
Tricolour marsh hawk	*Orthetrum luzonicum*	Libellulidae
Trumpet tail	*Acisoma panorpoides*	Libellulidae
Wandering glider	*Pantala flavescens*	Libellulidae
Aciagrion	*Aciagrion*	Coenagrionidae
Black winged bambootail	*Disparoneura quadrimaculata*	Protoneuridae
Black-tipped forest glory	*Vestalis apicalis*	Calopterygidae
Blue bush dart	*Copera vittata*	Platycnemididae
Blue grass dartlet	*Pseudagrion microcephalum*	Coenagrionidae
Clear-winged forest glory	*Vestalis gracilis*	Calopterygide
Coorg bambootail	*Caconeura ramburi*	Protoneuridae
Coromandel marsh dart	*Ceriagrion coromandelianum*	Coenagrionidae
Emerald spreadwing	*Lestes elatus*	Lestidae
Golden dartlet	*Ischunura aurora*	Coenagrionidae
Green striped slender dartlet	*Aciagrion occidentale*	Coenagrionidae
Malabar torrent dart	*Euphaea fraseri*	Euphaeidae
Orange marsh dart	*Ceriagrion rubiae*	Coenagrionidae
Orange-tailed marsh dart	*Ceriagrion cerinorubellum*	Coenagrionidae
Pigmy dartlet	*Agriocnemis pygmaea*	Coenagrionidae
Red striped threadtail	*Prodasineura verticalis*	Protoneuridae
River heliodor	*Libellago lineata*	Chlorocyphidae
Rusty marsh dart	*Ceriagrion olivaceum*	Coenagrionidae
Saffron reedtail	*Platysticta deccanensis*	Platycnemididae
Splendid dartlet	*Agriocnemis splendidissima*	Coenagrionidae
Stream glory	*Neurobasis chinensis*	Calopterygidae
Stream ruby	*Rhinocypha bisignata*	Chlorocyphidae
White dartlet	*Agriocnemis pieris*	Coenagrionidae

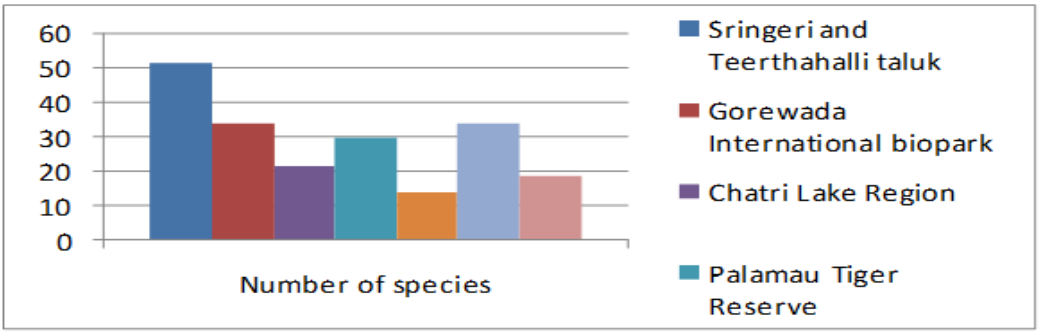

Fig1.Graph showing the differences in diversity of Odonates of Different regions

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