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Study on the dragonfly (Anisoptera: Odonata) fauna of district Larkana Sindh, Pakistan

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Abstract

A detailed odonatological field investigations were carried out to capture the dragonfly fauna of Larkana district, during March 2018 to October 2018 from various sites. Total of 215 samples recognized into 09 species under 05 genera pertaining to two families. The family Libellulidae was found most dominant with record of 08 species pertaining to 4 genera while family Aeshnidae was recorded with single species. Family Libellulidae showed its wide diversity and over all percentage of Libellulidae was recorded significantly highest (81.39%) and lowest that of family Aeshnidae (18.60%). Beside this, identification keys were also provided for easily isolation of families and genera.

Keywords: Odonata, identification keys, diversity, biological control, Larkana

1. Introduction

Order Odonata comprises dragonflies that are regarded as famous as a biocontrol agents. The body of odonates is longer and cylindrical in structure. They possess large compound eyes with shorter antennae and longer wings. As dragonflies pass their early life in water, most of them live in fresh water, whereas, some of them are able to survive in sea water. Most of the species are particular for some habitats such as deserts and alpiners [1]. Odonates are most often supposed as the bio indicators in many parts of the world, usually in temperate regions. These insects monitor environment and possess a good position in the environment [2]. They are used in daily life as a delicious dish, cooked in coconut oil and is served [3]. Dragonflies are valuable for medicinal purposes due to fact that people from some countries make medicines from them [5]. Dragonflies are the active predators, during nymphal stage mostly feed on the larvae of different invertebrates such as, the larvae of Mollusca, Platyhelminthes, crustaceans and annelids. Adult dragonflies too prey on variety of insects. So, Odonates are well known predators in both stages, nymphal and adult stage as well [4]. Larvae of Odonata also prey on larvae of insects including larvae of mosquito. A heed should be paid to conserve them as these make an important role in biodiversity, some species of dragonflies are going to extinct rapidly These are biologically important for research on them, specially in the field of their behavior and ecology As dragonflies are usually found flying on stagnant marshy water, so, these may also be understood as the bio-indicator of water quality. As dragonflies actively take part in biological control by eating larvae of most of the lethal parasites, whose larvae pass their developmental stage in water. Therefore, dragonflies are helpful in controlling the diseases such as, dengue fever, filariasis and malaria [6-9].

Class Insecta also contain one of the oldest order of Pterygote namely Odonata. Order Odonata is relatively small group of winged insects that contain about 5680 species [10] Some parts of the country like South East, have not been investigated well in detail. Most of the parts of Iran witness the poor performance and investigation on dragonflies except some parts, such as, Tehran and coastal area of Caspian [11]. Dragonflies and damselflies are relatively similar, and are the most well-known and significant active predators of an aquatic fauna and may occupy the top position in predation. Odonates are the important bio indicators of an ecosystem [12]. The aquatic nature of larvae and terrestrial form of an adult dragonfly and their relation in an aquatic and terrestrial ecosystem with numerous populations, their useful role in an ecosystem showing the multidimensional importance of Odonates as builders structural and functional parts of an ecosystem and diversified characters may be used to assess the quality and nature of an environment. The large body size of an adult provides comfortable way to study and report on taxonomy. Human activities cause disturbances in the habitat of dragonflies [12]. Lot of work has been done on odonatan fauna from different areas

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of Pakistan by [13-25] but no attention has been paid to the present study area. Therefore, it was felt necessary to investigate the odonatan fauna of this area.

2. Materials and Methods

The study material was collected during March to October 2018 from the district Larkana, Sindh. Larkana is the important district of Sindh province because the famous civilization of the world Mohen jo Daro of Indus Valley Civilization. Mohen jo Daro is also the famous archeological site that dates back to more than 5000 years old civilization. District Larkana is situated in the north and west of the upper Sindh. Indus river that is the largest and historic river of the Pakistan also flow from here. It comprises the 7423 sq km with total population of 1524391 according to 2018 census. Formerly Larkana was known as the Chandka. Climatic conditions vary depending on the seasons. Winter is mild cool whereas, Summer is very hot as temperature culminates up to 53 degree centigrade. Larkana is the fourth largest city of Sindh, also known as the Eden of Sindh. The captured dragonflies were killed in a jar containing chloroform. Killed dragonflies were pinned, recorded the area and date, the body parts were set on the stretching boards. After all the samples were labelled and preserved properly in in the collection boxes. Naphthalene balls were kept in the collection boxes along with preserved samples to save them from the attack of pests. The captured dragonflies were observed under the bi-ocular microscope for identification. For identification at species level identification keys and the already preserved dragonflies at Entomological lab of Zoology Department Shah Abdul Latif University Khairpur were also followed. Names and synonyms were given according to already reported species from Pakistan. The identified dragonflies were kept at the Entomological lab of Zoology department Shah Abdul Latif University Khairpur [26].

3. Results and Discussion

Order Odonata comprises dragonflies that are regarded as famous as a biocontrol agents. They are found in stagnant and running water. The body of odonates is longer and cylindrical

in structure. They possess large compound eyes with shorter antennae and longer wings. As dragonflies pass their early life in water, most of them live in fresh water, whereas, some of them are able to survive in sea water. Most of the species are particular for some habitats such as deserts and alpinas [1]. A detailed field investigations were carried out to capture the dragonfly fauna of Larkana district, during March 2018 to October 2018 from various sites. Total of 215 samples recognized into 09 species under 05 genera pertaining to two families. The family Libellulidae was found most dominant with record of 08 species pertaining to 4 genera while family Aeshnidae was recorded with single species. The family Libellulidae includes the major numbers of species as compare to Aeshnidae. The species were *Orthetrum sabina*, *Orthetrum chrysis*, *Orthetrum cancellatum*, *Orthetrum pruinosum neglectum*, *Acisoma panorpoides*, *Pantla flevescens*, *Crocothemis nigriforns*, *Crocothertumis servilia*, and *Anax imperator*. Family Libellulidae showed its wide diversity and over all percentage of Libellulidae was recorded significantly highest (81.39%) and lowest that of family Aeshnidae (18.60%) (Figure 2, 3 & 4, Table.1). Beside this, identification keys were also provided for easily isolation of families and genera. Yousaf [27] captured and recognized 6 subfamilies, 24 genera with 64 species and subspecies of dragonflies from different localities of Pakistan. Kumar and Prasad [28] surveyed Western-Himalaya and reported 162 species of dragonflies. Kanth [29] while surveying Azad Jammu and Kashmir reported 22 genera with 39 species of dragonflies. Sahito *et al.* [30] reported *Anax parthenope* from Sukkur division. At the present *Anax imperator* is first time captured and reported from district Larkana. Panhwar and Lakhia [31] gave description of *Crocothertumis servilia* from district badin. Present study agree with description given by them. Lakhia *et al.* [32] stated that the dragonfly fauna of Sindh is quiet diverse and should be explore for the confirmation and presence of species. This study agree with their statement. Beside this taxonomic keys and distributional of families is provided from the district Larkana. Hopefully, this study will contribute in the odonatological field.



Fig 1: Map of District Larkana

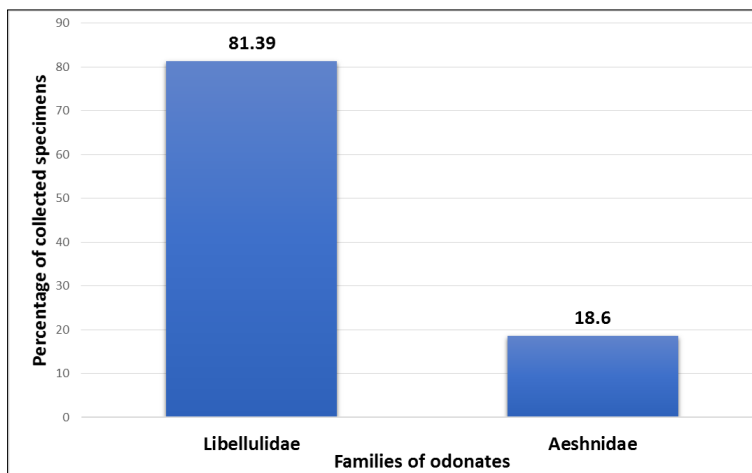


Fig 2: Showing percentage of specimens of families of dragonfly found in District Larkana

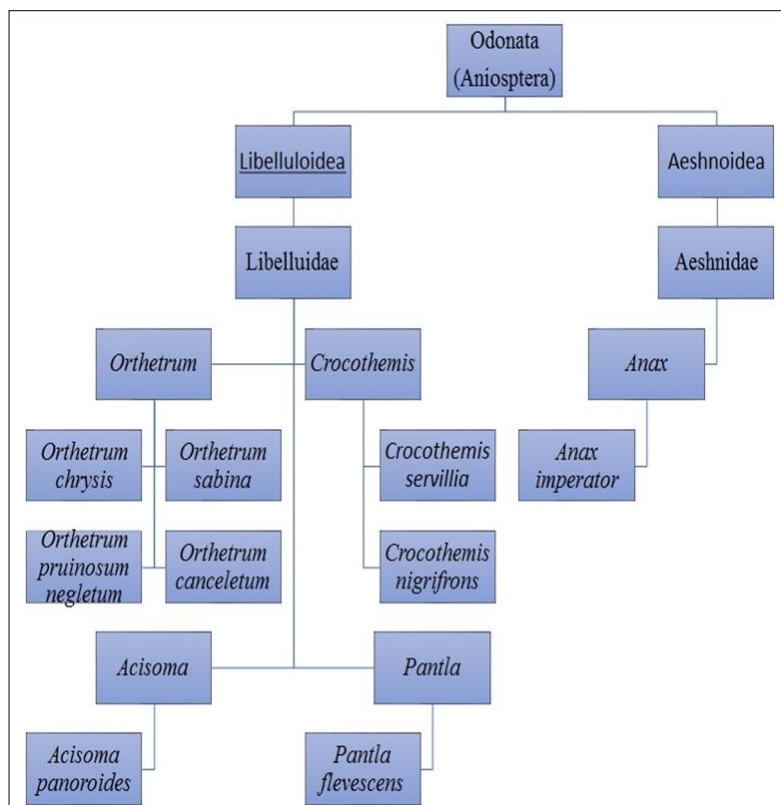


Fig 3: Showing the species collected from district Larkana

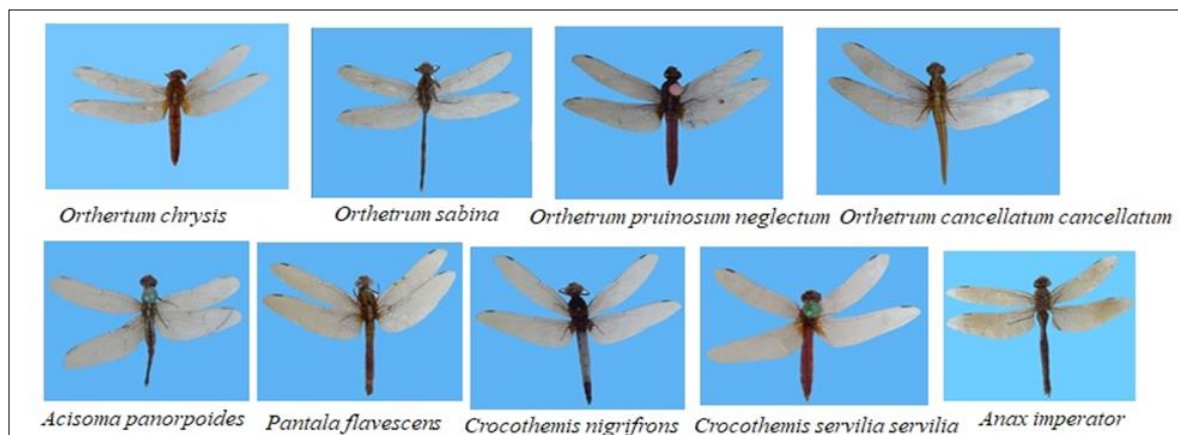


Fig 4: Showing the species of Odonates collected from district Larkana

Table 1: Showing No. & Percentage specimens of families of dragonfly found in District Larkana

Family	No. of Specimen (n=215)	Percentage (%)
Libellulidae	175	81.39
Aeshnidae	40	18.60

Taxonomic keys for dragonflies families found in District Larkana

1	Eyes very broadly joined. Thorax is metallic crossing the dorsal side of head. Fore & Hind wings with numerous discoidal cell of the similar size.	Aeshnidae
--	Eyes widely separated. Th thorax is not metallic and not crossing the dorsal side of head. Fore & Hind wings with socks shaped loops from anal side.	Libellulidae

Key to genera of family Libellulidae & Aeshinidae found in District Larkana

1.	Body cylindrical in shape, slim with small size.	<i>Acisoma</i> Rambur, 1842
--	Body medium size, elongated shape broad in their body structure.	<i>Orthetrum</i> Newman, 1833
2.	Abdomen shorter as compared with hind wings. While hind wings broader at base.	<i>Pantala</i> Hagen, 1861
--	Abdomen not shorter. While hind wings slim at its base slightly broader at apex.	3
3.	Reddish color of body. Amber yellowish spots present at base of wings.	<i>Crocothemis</i> Brauer, 1868
--	Brownish color of the body. Remarkable coloration of wings, with slight indigo color at base.	<i>Anax</i> Leach, 1815

4. Conclusion

Present study concludes the discovery of 09 species of dragonflies pertaining to 05 genera into 02 families. Beside this, the survey was conducted during the March 2018 to October 2018 from Larkana district of Sindh. In addition to this, the family Libellulidae includes the major numbers of species as compare to Aeshnidae.

5. Recommendations

- Morphological features are still the primary tools for identification but molecular techniques could be practiced for accurate systematic placement of Odonata fauna.
- Farmers should be taught through seminars about the role of Odonata as biocontrol agents.
- Efforts should be carried out for their mass Rearing and release.
- Steps should be taken to use odonates larvae in control of mosquitoes.
- Odonata of Sindh should be further explored.

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