ABSTRACT

Naiads of Odonata were collected from various marshlands of Tehsil Shakargarh, Punjab. Aquatic spots including seasonal streams, rice fields, temporary ponds, water filled holes of uprooted tress and muddy margins of rivers etc were visited in five selected localities. As a whole five Anisoptera (dragonfly) and four Zygoptera (damselfly) species were explored.

Keywords: Dragonflies, Immature, Marshland, Naiads, Odonata, Punjab

INTRODUCTION

Punjab province of Pakistan comes under important agricultural region of Pakistan. Its neighboring areas includes Indian states of Punjab and Rajasthan in east, Azad Kashmir and Indian held Jammu & Kashmir in north-east, province of Sindh to the south, Balochistan province to southwest, province of Khyber Pakthunkhwa to west and Capital Territory (Islamabad) in north. It possess three major seasons i.e. (i) hot weather which prevails from the month of April to June (with a maximum temperature of 110°F) (ii) Rainy season spreads over months of July to September (with an annual average rainfall between 96cms in sub-mountain region and 46cms in plains) (iii) cold weather which prevails during the months of October to March (when temperature falls to 40°F max.). Tehsil Shakargarh lies in north-east of Narowal District of Punjab province. It is located at west bank of River Ravi and has coordinates of 32°16'0N 75°10'0E. It is popularly known for its rich and fertile land for wheat and rice cropping throughout the world (Annonymous, 2011).

Members of order Odonata can be seen roaming almost everywhere in hundreds and thousands during summer season. During early summer most species lay eggs which hatch during the same season depending upon their specific life cycle. The immature as well as adults are important predators of wide range crop pests, especially of rice (Yousuf et al., 1998), cotton (Yousuf et al., 1995) and wheat (Din, 2012). Adults are known to feed on jassids, whiteflies, thrips, leaf folder, leaf hopper and white backed plant hopper of rice (Zia, 2010). Larvae are voracious feeders and popularly known to consume protozoans, small crustaceans and mosquito larvae (Irshad, 2008).

Many studies have been carried out in the past recording species composition and diversity of adults of Odonata in different ecological zones of Pakistan. However it has been noticed that negligible work has been done in studying their immature stages as well as exploring new habitats for their naiads. Knowing the importance of Odonata naiads as effective predators in aquatic ecosystem and keeping in view the lapses of previous studies it was planned to study immature stages of dragonflies and damselflies in various wetlands of tehsil Shakargarh of Punjab province, Pakistan.

MATERIALS AND METHODS

Odonata (dragonflies and damselflies) naiads were collected...
during summer months of the year 2010 from five selected sites i.e., Pindi Sainyan, Maryal, Chak Amru, Chatrana and Mardwal of Shakkargah, Punjab. Site Selection was done by keeping in view the habitat requirements of naiads. Collected specimens were killed in field in 95% alcohol as naiads carries lot of water/moisture with their bodies that dilutes the alcohol in killing vials. However in laboratory naiads were preserved in 70% alcohol. After bringing to laboratory, specimens were identified following taxonomic literature of Musser (1962), Anjum (1997), Chishti (1988), Hussain (1988), Khaliq et al. (1994-95), Yousof et al. (1996), Bouchard (2004) and Subramanian (2005). Information regarding valid names, synonyms, distribution and habitat description is provided for all the recorded species. Identified specimens were deposited under wet collection section of National Insect Museum at National Agriculture Research Center, Islamabad as reference collection for future studies.

RESULTS AND DISCUSSION

The study revealed record of five Anisopterous and four Zygopterous species collected under two families, eight subfamilies and genera. Details for the collected species is as below,

Family: Libellulidae

- Crocothemis servilia (Drury, 1770)
  1770 Libellula servilia Drury
  1781 Libellula ferruginata Fabricius
  1793 Libellula ferruginea Fabricius
  1842 Libellula soror Rambur
  1866 Erythemis servilia Brauer
  1868 Crocothemis servilia Brauer
  1878 Crocothemis erythraea Selys
  1879 Crocothemis servilia erythraea Selys
  1886 Crocothemis reticulata Kirby
  1866 Crocothemis soror Kirby
  1898 Crocothemis erythraea Subrace
  1936 Crocothemis servilia servilia Fraser

Material examined


Habitat

Collection was done from muddy water channels near different crop fields. Few specimens were also collected from marshes.

- Orthetrum glaucum (Brauer, 1965)
  1865 Libellula glauca Brauer
  1890 Orthetrum glaucum Kirby
  1965 Orthetrum gangi Sahni

Material examined

Chak Amru. 06. vi. 2010, 1?.

Habitat

A single male specimen was caught from weedy margin of a muddy water channel with lot of marshes and bushes around it.

- Orthetrum sabina (Drury, 1770)
  1770 Libellula sabina Drury
  1798 Libellula gibba Fabricius
  1839 Libellula leptura Burmeister
  1845 Libellula ampullacea Schneider
  1878 Leptemis divisa Selys
  1889 Orthetrum sabina Kirby
  1929 Orthetrum nigriscens Bartenev
  1942 Orthetrum vidatatum Lieftink

Material examined


Habitat

Specimens were collected from temporary water ponds.

- Trithemis aurora (Burmeister, 1839)
  1839 Trithemis aurora Burmeister
  1839 Libellula aurora Burmeister
  1868 Trithemis soror Brauer
  1878 Trithemis adelpha Selys
  1881 Trithemis fraterna Albarda
  1890 Trithemis congner Kirby

Material examined

Pindi Sainyan, 04. vi. 2010, 2? 2?; Chak Amru, 06. vi. 2010,
Habitat

Most of the specimens were collected from ferns near bank of river Ravi. However few were caught from stagnant ponds and other marshlands.

Family Coenagrionidae

Subfamily Ischnurinae

- *Ishnura aurora* Brauer, 1865
  
  1865  *Agrion aurora* Brauer
  1876  *Agrion delicatum* Hagen
  1876  *Ischnura delicata* Hagen
  1890  *Micronympha aurora* Kirby
  1920  *Nanosura aurora* Kennedy
  1965  *Ishnura bhimtalensis* Sahni

Material examined


Habitat

Majority of the naiads were collected from water ponds with grassy vegetation, however some were found residing nearby temporary rain water filled holes of uprooted trees. It was observed that in such holes mosquito nymphs and fly maggots were their major source to subsist.

Subfamily Agriocnemidinae

- *Agriocnemis splendidissima* Laidlaw, 1919

Material examined


Habitat

Collection was mainly made from the banks of stagnant water spots with lot of grassy submerged vegetation. Keeping in view the previous studies that focused only on species composition and diversity of adult odonates in Pakistan, it was decided to explore immature stages in different aquatic ecosystems of surveyed area. Results of this survey based study recorded nine odonate species from a single tehsil of Punjab province. This shows the need for extensive surveys to be undertaken throughout the province to explore immature stages of more species of this important bio-control agent of both aquatic as well as terrestrial ecosystem. Earlier the work on naiads was carried out by Chishti (1988), Hussain (1988), Khaliq *et al.* (1994, 1995), Yousuf *et al.* (1995, 1996), Anjum (1997), Hussain and Riaz (1999), Hussain and Riaz (2000), Hussain and Ahmed (2004), which were either based on a single species or limited localities. Recently Din (2012) explored Odonata naiads of Potohar plateau reporting thirty four (34) species under 21 genera which stressed the need for further taxonomic studies to be carried out in the country.

Subfamily Pseudagrioninae

- *Ceriagrion coromandelianum* Fabricius, 1898
  
  1798  *Agrion coromandelianum* Fabricius
  1842  *Agrion cerinum* Rambur

Material examined


Habitat

Collection was carried out from paddies and water channels of few other fields. Few specimens were also recorded from temporary muddy ponds of villages formed due to monsoon pelters. Lot of thin grassy vegetation was observed along with such ponds.

Subfamily Ischnurinae

- *Rhodischnura nursei* Morton, 1907

Material examined


Habitat

Collection was mainly made from the banks of stagnant water spots with lot of grassy submerged vegetation. Keeping in view the previous studies that focused only on species composition and diversity of adult odonates in Pakistan, it was decided to explore immature stages in different aquatic ecosystems of surveyed area. Results of this survey based study recorded nine odonate species from a single tehsil of Punjab province. This shows the need for extensive surveys to be undertaken throughout the province to explore immature stages of more species of this important bio-control agent of both aquatic as well as terrestrial ecosystem. Earlier the work on naiads was carried out by Chishti (1988), Hussain (1988), Khaliq *et al.* (1994, 1995), Yousuf *et al.* (1995, 1996), Anjum (1997), Hussain and Riaz (1999), Hussain and Riaz (2000), Hussain and Ahmed (2004), which were either based on a single species or limited localities. Recently Din (2012) explored Odonata naiads of Potohar plateau reporting thirty four (34) species under 21 genera which stressed the need for further taxonomic studies to be carried out in the country.

REFERENCES


