

## A LIST OF DRAGONFLIES (ANISOPTERA: ODONATA) WITH NEW RECORDS FROM PAKISTAN

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### ABSTRACT

The study is based upon dragonflies collected from different localities of Sindh Province, Pakistan, between 2006-2010. In this work, sixteen species, belonging to the eleven genera representing three families and two subfamilies are listed, including nine newly recorded species from Pakistan. Key to the families, genera of subfamily Libellulinae and species of the genus *Anax* Leach of Sindh, Pakistan also provided.

**Key words:** Odonata, Anisoptera, Species list, new records, Sindh, Pakistan.

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### INTRODUCTION

Dragonflies have great agricultural importance because they are voracious predators of those insects which are pests of many field crops (Yousuf and Chishti, 1986). The first description of a dragonfly, *Neurobasis chinensis*, from India was given by Linnaeus (1792). Then Drury (1773) gave descriptions of six species and Fabricius (1792) described eight more species. Rambur (1842), in his monograph of the World Neuroptera, gave the older species from India. Selys (1831-1902) published many papers on World dragonflies which contained descriptions of a large number of species from Indian subcontinent. Kirby (1890) published his synonymic catalogue of the Neuroptera-Odonata including all the species upto that time.

Laidlaw (1915) produced three installments of notes on the Oriental dragonflies in the Indian Museum. He also published lists of dragonflies of the Indian empire with descriptions of many new species (1917-1922). Needham (1932) published a key to the families, genera and known species of the Indian dragonflies. The real foundation of this order from Indian subcontinent by Fraser (1933-1936), who accomplished the fauna from India, Ceylon and Burma. Williamson (1905); Morton (1907); Kumar and Prasad (1981); Rahman and Yousuf (1994); Yousuf *et al.*, (2000); Khaliq *et al.*, (1992); Khaliq *et al.*, (1993); Rafi *et al.*, (2009) and Zia *et al.*, (2009) also contributed classification dragonflies from Indian subcontinent including Pakistan.

Here, we provided new information and records on Dragonfly from Sindh Province, Pakistan based on newly collected material. The adult dragonflies were collected during the years of 2006-2010 from Sukkur, Nawabshah, Jamshoroo, Hyderabad, Badin, Thatta and Karachi, Sindh Province, Pakistan.

### MATERIALS

The adult were collected with the help of a folding insect collecting hand-net. Specimens also studied from the following museums; Pakistan Zoological Survey Museum, Karachi, Pakistan (**PZSM**). Natural History Museum, University of Karachi, Pakistan (**NHMUK**). Fraser's terminology of 1933-36 followed in this work and no new term has been introduced. The identified specimens have been deposited in the **NHMUK**.

#### Order Odonata

#### Suborder Anisoptera

#### Key to the Families of the suborder Anisopter of Sindh

1- Eyes widely separated; discoidal cells unequal, that of hind-wing more elongate than that of fore-wings, median space never traversed.....**Gomphidae**

-. Eyes only very slightly separated or meeting at a point, discoidal cells of fore- and hind wings equal in size and shape, or, if dissimilar, then the median space traversed by one or more veins.....**2**

2- Discoidal cells approximately of the same size and shape in fore- and hind-wings and situated equally distant from the arc, costal and sub costal antenodal nervures not coinciding, the two robust primary antenodals present, middle lobe of labium large 3 and fissured.....**Aschnidae**

-. Discoidal cells differing in size and shape in fore - and hind-wings, that of fore -wing situated far distal of the arc; middle lobe of labium very small, not fissured, broadly overlapped by the lateral lobes, costal and subcostal antenodal nervures coinciding, the robust primary antenodals absent .....**Libellulidae**

### Family Aeshnidae

#### Subfamily Anaxinae

#### Genus *Anax* Leach, 1815

Type Species *Anax imperator* Leach, 1815

#### Key to the species of the genus *Anax* Leach of Sindh

1- Eyes olivaceous, labrum citron golden without black border.....***A. ephippiger* (Burmeister)**

-. Eyes bluish green, labrum golden yellow or ochreous with black border.....**2**

2- Wings uncoloured, a small crown-shaped spot on upper surface of frons, thorax pale bluish – green.....***A. imperator* Leach**

-. Wings tinted with yellow on outer three fourths, frons with pale blue stripe above, thorax palest brown.....***A. parthenope* (Selys)**

#### ***Anax ephippiger* (Burmeister, 1839) (Fig:1)**

*Aeschna ephippigera* Burmeister, 1839:840.

*Anax ephippigera* Hagen, 1867:31.

**Material examined:** Pakistan; Sindh Province, Karachi, 12 male; 5.vii.2005, leg. Asif; 1 male; 4.vi.2006, leg. Zubair; 4 male; 21.ii.1972, leg. Rizvi, (NHMUK); Mirpur Khas, 1 male; 10.v.2007, leg. Zubair; Nagarparker, 1 female; 12.v.2007, leg. Zubair.

**Comparitive remarks:** This species entirely isolated to both species *A. imperator* and *A. parthenope* by their large size, dorsal upper abdomen, forewings hyaline and hind wings with a patch of amber yellow.

**Distributions:** S. Europe, N. Asia to India, Egypt, Mesopotamia, Pakistan.

#### ***Anax imperator* Leach, 1815. (Fig: 2)**

*Anax imperator* Leach, 1815:137.

**Material examined:** Pakistan; Sindh Province, Karachi, 8 male; 5.vii.2007, leg. Asif; 1 male; 4.vi.2006, leg. Asif; 1 male; 21.ii.1972, leg. Rizvi, (NHMUK); Mirpur Khas, 1 male; 10.v.2007, leg. Zubair.

**Comparitive remarks:** This species is much closest to *A. parthenope* by labium and labrum golden yellow but isolated by wings uncolored, a small crown-shaped spot on upper surface of frons and thorax pale bluish green.

**Distribution:** Europe, Central Asia, North Africa, Pakistan.

#### ***Anax parthenope* (selys, 1839) (Fig: 3)**

*Aeschna parthenope* selys, 1839:389.

*Anax parthenope geyri* Buchholz, 1955:122.

**Material examined:** Pakistan; Sindh Province, Karachi, 4 male; 5.vii.2006, leg. Asif; 1 male; 4.vi.2007, leg. Asif; Hyderabad, 2 males; 8.vii.2007, leg. Asif.

**Comparitive remarks:** This species is closely related to *A. imperator* by labium and labrum golden yellow but isolated by wings tinted with yellow on outer three fourth, frons with pale blue stripe above and thorax palest brown.

**Distribution:** Pacific, East Cost of Peninsula, India and Pakistan.

### Family Gomphidae

#### Genus *Ictinogomphus* Rambur, 1842

Type species: *Diastatomrna repax* Rambur

***Ictinogomphus rapax* (Rambur, 1842) (Fig: 4)***Diastatoma rapax* Rambur, 1842:169.*Ictinogomphus rapax* Selys, 1854:90.**Material examined:** Pakistan; Sindh Province, Karachi, 8 male; 5.vi.2008, leg. Asif; 1 male; 14.vi.2009, leg. Asif; Hyderabad, 2 males; 8.vii.2007, leg. Asif; Jamshoroo, 1 female; 7.vii.2007, leg. Zubair.**Comparative remarks:** This species is closely related to *I. pertinax* by face largely black, posterior border of thorax margined with black and femora largely black but isolated by segment 8 with a broad yellow ring.**Distributions:** India, Nepal, Sri Lanka, Malaysia and Pakistan.**Genus *Paragomphus* (Leach, 1815)*****Gompln* Leach, 1815:137.*****Paragomphus* Rambur, 1842:154.**Type species: *Leslma ibellula vugatissima* Linneaus***Paragomphus genei* (Gani, 1861) (Fig: 5)***Gomphus genei* Gani, 1861:114.*Paragomphus genei* Ris, 1909:36.**Material examined:** Pakistan; Sindh Province, Jamshoroo, 1 female; 7.vii.2007, leg. Zubair. **New country record.****Comparative remarks:** This species is monotypic species which has unique characters as, frons pale yellow with greenish; Wings transparent with pale yellow shed and brown above black keeled medially with rows.**Distribution:** Oriental region.**Family Libellulidae****Subfamily Libellulinae****Key to the Genera of the Subfamily Libellulinae of Sindh**

- 1- Pterostigma bicolorous.....*Bradinopyga* Kirby  
 -. Pterostigma unicolorous.....2
- 2- Wings broadly marked with black and golden amber.....*Rhyothemis* Hagen  
 -. Wings not marked with black and golden amber.....3
- 3- Wings short and broad.....*Diplacodes* Kirby  
 -. Wings long.....4
- 4- Hind femora with short spines.....5  
 -. Hind femora with long or gradually lengthening long spines.....6
- 5- Pterostigma unequal in fore wings and hind wings..... *Tramea* Hagen  
 -. Pterostigma equal in fore wings and hind wings.....*Crocothemis* Brauer
- 6- Frons without crest.....*Brachythemis* Brauer  
 -. Frons with distinct crest.....7
- 7- 1 cubital nervure in all wings..... *Orthetrum* Newman  
 -. 1 cubital nervure in fore wings, 2 in hind wings.....*Pantala* Hagen

**Genus *Brachythemis* Brauer, 1868:367.*****Brachythemis* Brauer, 1868.**Type species: *Libellula contaminata* Fabricius

Fig. 1. *Anax ephippigera*.Fig. 2. *Anax imperator*.Fig. 3. *Anax parthenope*.Fig. 4. *Ictinogomphus rapax*.Fig. 5. *Paragomphus genei*.Fig. 6. *Brachythemis contaminata*.Fig. 7. *Bradinopyga geminata*.Fig. 8. *Crocothemis servilia erythraea*.Fig. 9. *Crocothemis servilia servilia*.Fig. 10. *Diplacodes trivialis*.Fig. 11. *Orthetrum preuinusum neglectum*.Fig. 12. *Orthetrum sabina*.Fig. 13. *Pantala flavescens*.Fig. 14. *Rhyothemis variegata*.Fig. 15. *Tramea basilaris*.Fig. 16. *Tramea limbata*.

***Brachythemis contaminata* (Fabricius, 1793) (Fig: 6)**

*Libellula contaminata* Fabricius, 1793:382.

*Brachythemis contaminata* Brauer, 1868:736.

**Material examined:** Pakistan; Sindh Province, Sukkur, 2 male; 12.vi.2007, leg. Asif; 4 male; 13.vi.2007, leg. Asif; Nosheroferoz, 7 males; 13.vi.2007, leg. Asif. **New country record.**

**Comparative remarks:** This species is monotypic species which has unique characters as prothorax ochreous with dark reddish brown stripes, wings transparent with reddish venations and abdomen reddish ochreous.

**Distribution:** Java, Sumatra, China Philippines, Nepal, Sri Lanka, India and Pakistan.

**Genus *Bradinopyga* Kirby, 1893.**

*Bradinopyga* Kirby, 1893:553.

Type species *Libellula geminata* Rambur

***Bradinopyga geminata* (Rambur, 1842) (Fig: 7)**

*Libellula geminata* Rambur, 1842:90.

*Bradinopyga geminata* Ris, 1911:545, 548.

**Material examined:** Pakistan; Sindh Province, Sukkur, 1 male; 12.vi.2007, leg. Asif; 3 male; 13.vi.2007, leg. Asif; Nosheroferoz, 2 males; 13.vi.2007, leg. Asif.

**Comparative remarks:** This species is monotypic species which has unique characters as thorax and prothorax dirty pale brown, marked and peppered with black irregular manner and abdomen black marked with yellow.

**Distribution:** India and Pakistan.

**Genus *Crocothemis* Brauer, 1868.**

*Crocothemis* Brauer, 1868:367, 736.

Type species: *Libellula servilia* Drury

***Crocothemis servilia erythraea* (Fourcroy, 1785) (Fig: 8)**

*Libellula victoria* Fourcroy, 1785:348.

*Crocothemis servilia erythraea* Fraser, 1936:517.

**Material examined:** Pakistan; Sindh Province, Badin, 1 male; 15.vi.2007, leg. Asif; 5 male; 13.vi.2007, leg. Asif; Karachi, 2 males; 13.vii.2007, leg. Asif.

**Comparative remarks:** This species is very closely related with *C. servilia servilia* but isolated by segments 8 and 9 of abdomen without black markings on mid –dorsal carina, base of hamules more acute and prolonged, hooks without a minute tooth near apex and wings without brown suffusion.

**Distributions:** S. Europe, Africa Egypt, Saudi Arabia, India and Pakistan.

***Crocothemis servilia servilia* (Drury, 1770) (Fig: 9)**

*Libellula servilia* Drury, 1770:112, 113.

*Crocothemis servilia servilia* Fraser, 1936:345.

**Material examined:** Pakistan; Sindh Province, Badin, 3 male; 15.vi.2007, leg. Asif; 2 male; 13.vi.2007, leg. Asif; Karachi, 1 males; 13.vii.2007, leg. Asif.

**Comparative remarks:** This species is very closely related to *C. servilia erythraea* by their physical appearance but clearly isolated by segment 8 and 9 of abdomen with black markings on mid dorsal carina, base of hamules truncate and short, hooks of hamules with minute tooth near apex and wings with brown suffusion.

**Distributions:** Australia, Japan, Philippines, Nepal, Sri Lanka, India and Pakistan.

**Genus *Diplacodes* Kirby, 1889.**

*Diplacodes* Kirby, 1889:263, 307.

Type species: *Libellula lefedurei* (Rambur)

***Diplacodes trivialis* (Rambur, 1842) (Fig: 10)**

*Libellula trivialis* Rambur, 1842:115.

*Diplacodes trivialis* Karsch, 1891:278.

**Material examined:** Pakistan; Sindh Province, Karachi, 4 male; 12.vi.2009, leg. Asif; 4 male; 13.vi.2007, leg. Asif; Jamshoroo, 7 males; 13.vi.2007, leg. Asif; Hyderabad, 3 female; 15.viii.2008, leg. Zubair. **New country record.**

**Comparative remarks:** This species is very closely related to *D. lefebvrei* by apices of wings hyaline but isolated by adult black marked with yellow or blue unroughout, wing uncolored except at base and anal appendages yellow.

**Distributions:** Africa, India and Pakistan.

**Genus *Orthetrum* Newman, 1833.**

*Orthetrum* Newman, 1833:511.

Type species: *Libellula coerulescens* Fabricius

***Orthetrum preuinsum neglectum* (Rambur, 1842) (Fig: 11)**

*Libellula neglecta* Rambur, 1842:86.

*Orthetrum preuinsum neglectum* Ris, 1909:181.

**Material examined:** Pakistan; Sindh Province, Thatta, 3 male; 13.vii.2010, leg. Asif; 6 male; 16.vii.2007, leg. Asif; Badin, 4 males; 13.vii.2008, leg. Asif. **New country record.**

**Comparative remarks:** This species is closely related with *O. chrysis* and *O. testaceum* by their physiological appearance but isolated these two species by unique violet colored and abdomen which is quite different red color of rest species.

**Distributions:** Tibet, Hong Kong, China, Nepal, Sri Lanka, India and Pakistan.

***Orthetrum sabina* (Drury, 1770) (Fig: 12)**

*Libellula sabina* Drury, 1770:114, 115.

*Orthetrum sabina* Kirby, 1889:302.

**Material examined:** Pakistan; Sindh Province, Thatta, 1 male; 13.vii.2010, leg. Asif; 4 male; 16.vii.2007, leg. Asif; Badin, 1 males; 13.vii.2008, leg. Asif. **New country record.**

**Comparative remarks:** This species is clearly isolated by other species within the genus by extra ordinary shape of the abdomen which is greenish yellow marked with black.

**Distributions:** Somaliland, Mesopotamia, Persia and Pakistan.

**Genus *Pantala* Hagen, 1861.**

*Pantala* Hagen, 1861:141.

Type species: *Libellula flavescens* Fabricius

***Pantala flavescens* (Fabricius, 1798) (Fig: 13)**

*Libellula flavescens* Fabricius, 1798:285.

*Pantala flavescens* Hagen, 1861:142.

**Material examined:** Pakistan; Sindh Province, Nawabshah, 2 male; 15.vi.2010, leg. Asif; Karachi, 1 male; 16.vi.2007, leg. Asif; Badin, 1 males; 13.vii.2008, leg. Asif. **New country record.**

**Comparative remarks:** This species is monotypic species which has unique characters as prothorax transverse belt reddish brown between anterior and middle lobes and abdomen bright ochreous.

**Distributions:** Tibet, Nepal, Sri Lanka, India and Pakistan.

**Genus *Rhyothemis* Hagen, 1867.**

*Rhyothemis* Hagen, 1867:232.

Type species: *Libellula thyllis* Sulzer

***Rhyothemis variegata* (Linnaeus, 1763) (Fig: 14)**

*Libellula variegata* Linnaeus, 1763:412.

*Rhyothemis variegata* Ris, 1913:931. Ris, 1913:931, 935.

**Material examined:** Pakistan; Sindh Province, Badin, 1 male; 18.vi.2008, leg. Asif; 2 male; 13.vi.2008, leg. Asif; Karachi, 2 males; 13.vii.2007, leg. Asif. **New country record.**

**Comparative remarks:** This species is closely related to *R. Phyllis* by wings marked with black and amber yellow but isolated by wings tinted yellow, forewing with spots at node and apex hyaline.

**Distributions:** Malaysia, Nepal, Sri Lanka, India and Pakistan.

**Genus *Tamea* Hagen, 1861.**

*Tamea* Hagen, 1861:114.

Type species: *Libellula carolina* Linnaeus

***Tamea basilaris* (Kirby, 1889) (Fig: 15)**

*Tramea burmeisteri* Kirby, 1889:316.

*Tramea basilaris* Ris, 1913:975.

**Material examined:** Pakistan; Sindh Province, Badin, 5 male; 15.vi.2007, leg. Asif; 1 male; 13.vi.2007, leg. Asif; Karachi, 2 males; 13.vii.2007, leg. Asif. **New country record.**

**Comparative remarks:** This species is closely related to *T. limbata* by hamule much longer and greatly overlapping lobe but isolated by two large black spots at base of hind wing surrounded by a golden-yellow areola.

**Distributions:** Sri Lanka, Nepal, India and Pakistan.

***Tramea limbata* (Desjardins, 1832) (Fig: 16)**

*Libellula limbata* Desjardins, 1832:1.

*Tramea limbata* Brauer, 1866:564.

**Material examined:** Pakistan; Sindh Province, Badin, 1 male; 15.vi.2007, leg. Asif; 1 male; 13.vi.2007, leg. Asif; Karachi, 1 males; 13.vii.2007, leg. Asif. **New country record.**

**Comparative remarks:** This species is closely related to *T. basilaris* by hamule much longer and greatly overlapping lobe but isolated by black spot in hind wing confined to base, very narrow, not invading base of anal loop.

**Distributions:** Sri Lanka, India and Pakistan.

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