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## SHORT COMMUNICATION

### FURTHER ADDITIONS TO THE ODONATA (INSECTA) FAUNA OF ASANSOL-DURGAPUR INDUSTRIAL AREA, PASCHIM BARDHAMAN, INDIA

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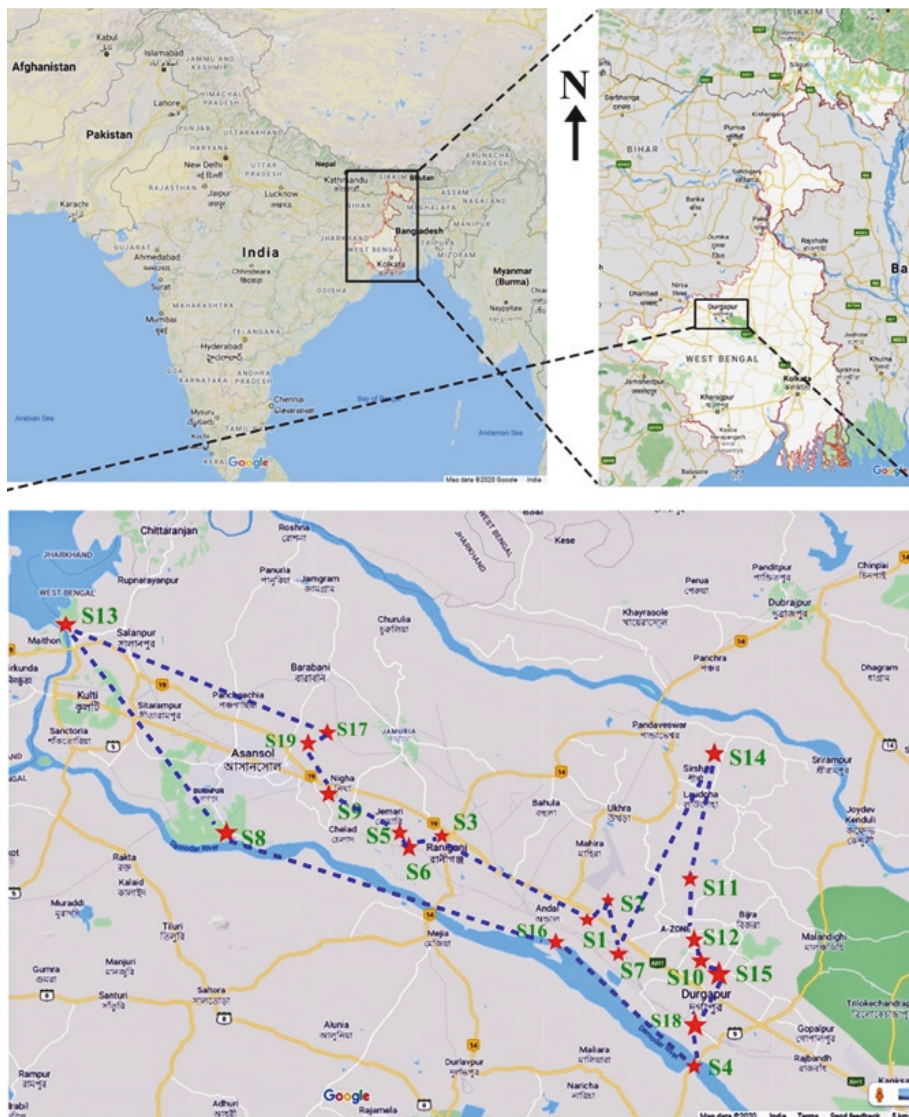


Figure 1. Study sites (S1–S19) under present investigation from Asansol-Durgapur area of Paschim Bardhaman District from West Bengal, India. Source – Google Maps.

300mm lens were used for photo documentation of the odonates.

## RESULTS

A total of 13 different Odonata species were recorded including both dragonflies (Anisoptera) and damselflies (Zygoptera) (Figure 2), which were represented by 12 genera from seven families. Among these, three families were represented by damselflies (Zygoptera), viz., Lestidae (One species and one genus), Chlorocyphidae (One species and one genus), and Coenagrionidae (two species and two genera) (Figure 3). Rest of the families was represented by dragonflies (Anisoptera), viz., Aeshnidae (two species and two genera), Gomphidae (one species and one genus), Macromiidae (two species

and one genus), and Libellulidae (four species and four genera) (Figure 4). Comparison of the previously reported and the new reports of Anisoptera and Zygoptera sub-order from the study region are represented by Figures 5 & 6, respectively. All these 13 species found in Ajay-Damodar River basin area are new reports for the entire district. Systematic arrangement of the species follows Subramanian & Babu (2017). A detailed account of the species is given below:

Suborder Anisoptera Selys, 1854

Family Aeshnidae Leach, 1815

1. *Anax indicus* Lieftinck, 1942

IUCN status: Least Concern (Mitra 2010)

Sighted on: 18.x.2016, 02.xi.2018, 18.x.2019, 05.ix.2020,



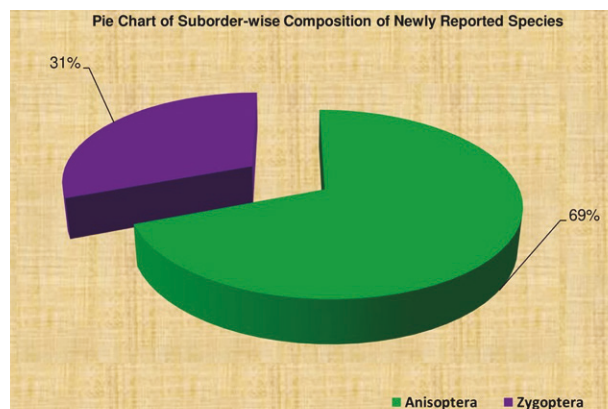


Figure 2. Percentage of newly recorded species of Anisoptera and Zygoptera from Asansol-Durgapur Industrial Area.

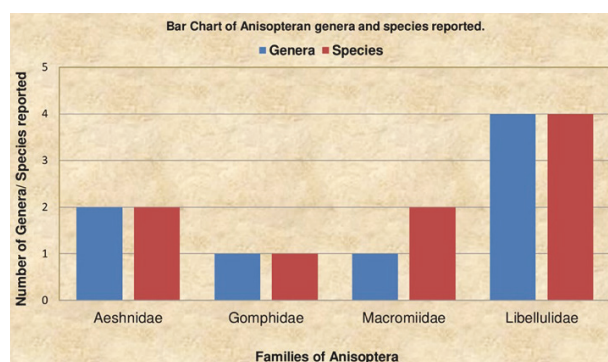


Figure 3. Family-wise numbers of anisopteran genera and species reported during the present study.

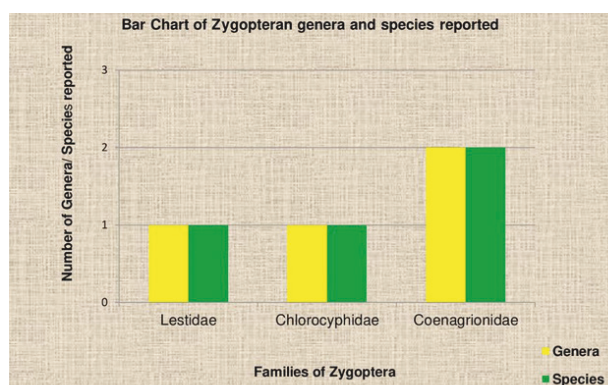


Figure 4. Family-wise numbers of zygopteran genera and species reported during the present study.

28.x.2020; Study sites: S1, S12, S14

Comments: This species is commonly seen in the study region. It hovers above wetlands and water bodies. We found two individual females in different place and time, hanging vertically inside the scrub during day time.

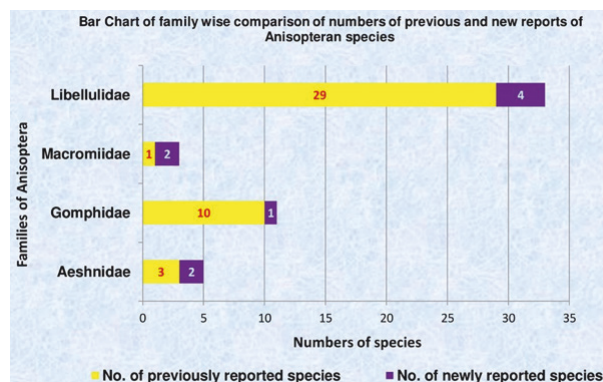


Figure 5. Family-wise comparison of numbers of previous and new reports of anisopteran species.

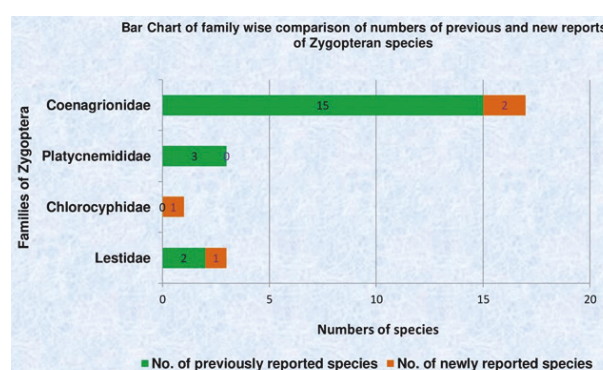


Figure 6. Family-wise comparison of numbers of previous and new reports of zygopteran species.

AKN found this species frequently from S1. From S12 & S14 each, single female individuals have been sighted by Sagar Adhurya & SR, respectively.

## 2. *Gynacantha* cf. *subinterrupta* Rambur, 1842

IUCN status: Least Concern (Dow 2011)

Sighted on: 18.i.2013, 24.vi.2013, 11.vii.2013; Study sites: S3, S5

Comments: This species was confused with similar other *Gynacantha* species. With the help of the description given by Khan (2015) and by the images of the 'Odonata of India' website (Joshi et al. 2020), author found similarities with *Gynacantha subinterrupta* species but due to lack of a specimen authors cannot confirm the photograph as *Gynacantha subinterrupta* without matching secondary genitalia. So we decided to report this observation as *Gynacantha* cf. *subinterrupta*. This species prefers shaded area. From S3, AKN found one male and one female and a single male individual were sighted by AKN from S5.

**Table 1.** Brief description with altitude, latitude, and longitude of the selected study sites.

| Study site | Location name   | Altitude (meters) | Latitude (N) | Longitude (E) | Habitat type  |
|------------|---|-------------------|--------------|---------------|---|
| S1         | Dubchururia Village, Andal, Durgapur                        | 93                | 23.576°      | 87.227°       | Remnants of dry deciduous forests with more than 20 large water bodies.   |
| S2         | Andal old aerodrome, Andal, Durgapur                        | 84                | 23.588°      | 87.230°       | Open grassland and agricultural land with a slow flowing perennial stream.  |
| S3         | Searssole Junior Basic School, Raniganj, Asansol            | 113               | 23.630°      | 87.109°       | Planted trees with four large water bodies surrounded by agriculture land.  |
| S4         | Durgapur Barrage, Durgapur                                  | 70                | 23.475°      | 87.302°       | Wetland dependent mixed vegetation with a perennial river.  |
| S5         | Nimcha village, Raniganj, Asansol                           | 114               | 23.638°      | 87.089°       | Remnants of dry deciduous forests with eight large water bodies, interspersed with agricultural land.   |
| S6         | Nimcha Coal Mine area, Raniganj, Asansol                    | 95                | 23.636°      | 87.093°       | Mixed forest with a slow flowing perennial stream and open coal pits.   |
| S7         | Gopalmath Rail Colony, Durgapur                             | 71                | 23.569°      | 87.229°       | Open grassland and agricultural land with more than 10 large water bodies.  |
| S8         | Nehru Park, Burnpur, Asansol                                | 104               | 23.634°      | 86.947°       | Remnants of dry deciduous forests with a slow flowing perennial stream and a river.   |
| S9         | Gunjan Ecological Park, Nigha, Asansol                      | 98                | 23.664°      | 87.028°       | Wetland dependent, mixed vegetation with an abandoned open-cast coal mine converted into a large water body.  |
| S10        | Ambuja Wetland, City Centre, Durgapur                       | 104               | 23.540°      | 87.306°       | Wetland dependent mixed vegetation with a large water body.   |
| S11        | Rana Pratap, A-Zone, Durgapur                               | 97                | 23.601°      | 87.295°       | Remnants of dry deciduous forests with a slow flowing perennial stream.   |
| S12        | Mohan Kumarmangalam Park, B-Zone, Durgapur                  | 109               | 23.564°      | 87.301°       | The study area is covered by mixed vegetation with a large water body.  |
| S13        | Kalyaneshwari Temple, Kalyaneshwari, Asansol                | 110               | 23.777°      | 86.829°       | The study area situated beside the temple and the habitat is remnant of dry deciduous forests with a slow flowing perennial stream.   |
| S14        | Tumni River, Balijuri village, Faridpur-Durgapur            | 71                | 23.688°      | 87.321°       | This place is situated at the bank of Ajay River. The Tumni river is a slow flowing perennial stream. Natural marshes and bushes at the study point.  |
| S15        | Uttar Pally, M.A.M.C., Durgapur                             | 92                | 23.540°      | 87.326°       | The study area is a pond. The pond is located with hamlet to its west and south, forest on the north and paddy fields to the east and south.  |
| S16        | Damodar River Bank, Srirampur Village, Durgapur             | 71                | 23.561°      | 87.197°       | The area has been covered by trees, marshes, bushes, paddy fields and other crop yielding fields.   |
| S17        | Girmint Colliery, Kankhaya, Asansol                         | 115               | 23.707°      | 87.029°       | An underground colliery abandoned after a fire, it is now overgrown with secondary vegetation of shrubs and bushes and surrounded by rural grasslands. A small rectangular cemented manmade water tank, previously used to supply water to the boiler, is the only water body.                      |
| S18        | Durgapur Projects Limited Township, Gammon Bridge, Durgapur | 91                | 23.499°      | 87.304°       | Backyard of an urban bungalow with both ornamental garden plants, trees bearing edible fruits and natural shrubs facing a tiny remnant of primary <i>Shorea robusta</i> forest on the opposite side of the road. No water bodies around.  |
| S19        | Garui River, Satpukuria village, Asansol                    | 104               | 23.700°      | 87.009°       | Densely forested, almost impenetrable sacred grove of remnant primary vegetation around a temple on one bank of the Garui River, and agricultural fields on the opposite bank. The riverbed, home to diverse emergent and submerged aquatic macrophytes interspersed with rocky boulder formations. |

Family Gomphidae Rambur, 1842

3. *Cyclogomphus heterostylus* Selys, 1854

IUCN status: Data Deficient (Dow 2009)

Sighted on: 19.vii.2015; Study site: S4

Comments: This species is not commonly seen in this region. Only a single male was sighted in the field by AKN. The diagnostic characteristics of *Cyclogomphus heterostylus* Selys, 1854 are - thorax with two “Y”-shaped markings on each side; superior anal appendages pale yellow, short, straight, slightly separated, and

directed straight backwards (Fraser 1934). The species is very similar to *Cyclogomphus ypsilon* Selys, 1854 and *Cyclogomphus wilkinsi* Fraser, 1926. Fraser (1934) stated that the differences indicated by Selys are found inconsistent on examination of a large number of specimens, so that no dependence can be placed on the colouration and nodal index to separate *C. heterostylus* from *C. ypsilon* and *C. wilkinsi*. Few characteristics to differentiate these three species are given by Fraser such as, the distinctly thicker black band on the lower part of

frons, entirely yellow labrum, two “Y”-shaped markings on each side of the thorax, superior anal appendages short, straight, slightly separated, and directed straight backwards and the inferior is relatively much longer and directed straight up possessed by *C. heterostylus*. The difference between male and female of *C. heterostylus* are not stated by Fraser but female of rest of two species have only some minor differences like bigger size, extensive black markings etc.

Family Macromiidae Needham, 1903

4. *Macromia cingulata* Rambur, 1842

IUCN status: Least Concern (Subramanian 2011)

Sighted on: 07.vii.2020, 08.vii.2020; Study site: S1

Comments: Only one male and one female individual have been found by AKN, hanging vertically from an electric wire. Identification has been done using Fraser (1924, 1936) and Subramanian et al. (2018). Mitra (2002) reported its distribution in Bengal as per literature review Dawn (2021), reports its distribution from Purulia District, southern West Bengal. In the present paper authors report a confirm photographic record of the species from southern West Bengal. The distribution of this species now extends from Purulia to Paschim Bardhaman District, West Bengal.

5. *Macromia flavicincta* Selys, 1874

IUCN status: Data Deficient (Dow 2010)

Sighted on: 02.viii.2018, 23.vi.2020, 10.x.2020; Study sites: S4, S16

Comments: This species was found from the same place (S16) in 2018 and 2020 by Arijit Mondal. Recently AKN found a female hanging from the branch of a tree near Durgapur Barrage (S4). Identification has been done using Fraser (1924, 1936), Subramanian et al. (2018), and images in ‘India Biodiversity Portal’ website (Tiple 2013; Balachandran 2016). No photographic record of this species was found from West Bengal. But the distribution of this species in West Bengal was reported by Srivastava & Sinha (1993) on the basis of literature review. Mitra (2002) also reported its distribution in West Bengal. Apart from West Bengal it has photographic report from Maharashtra by Tiple & Koparde (2015). Diagnostic characteristics of *Macromia flavicincta* are given by Fraser (1936) – for male: a medium size dragonfly (Abdomen: 47–50mm, Wing span: 41–43mm) with black abdomen and ringed with citrine-yellow. Labium is bright yellow-orange colour, labrum is bright yellow, frons bright citrine-yellow with a broadly black thick line. Eyes are emerald green, occiput dark brown and yellow spot behind vesicle. Prothorax

and thorax are also dark brown with metallic blue reflex and marked with citrine-yellow. Bold and large stripes on the humeral region. Legs are black. Wings hyaline and palely tinted with yellow-brown. Pterostigma is black. Anal appendages is dull yellow-orange colour, superiors as long as segment 9. Female (Abdomen: 50–53mm, Wing span: 43–44mm) of the species is brighter in colour, abdomen markedly compressed and of even width throughout as seen from the above. Wings are more tinted with brown and anal appendages is reddish brown and shortly conical. This species can be distinguished from other species of same genus by its very broad abdominal yellow annules, entirely yellow labium, and by the black T-shaped mark on the frons. It differs from *M. cingulata* in having an entirely yellow labium. *M. cingulata* is also more slender insect. *Macromia flavicincta* is closely allied to *M. flavovittata* Fraser, 1935. The distinguishing characteristics of these two species are - *M. flavovittata* has labrum with no broadly black stripe, no yellow spot behind eyes, abdominal segments 3 to 6 with paired dorsal spots and shape of the male anal appendages (Fraser 1936).

Family Libellulidae Leach, 1815

6. *Hydrobasileus croceus* Brauer, 1867

IUCN status: Least Concern (Mitra 2010)

Sighted on: 05-ix-2020; Study site: S1

Comments: The species is a new record for the Paschim Bardhaman District. The photographic record of the species has been found from northern West Bengal (Pal 2017). Mukherjee et al. (2016) also reported the species from Bankura District. So this is the second report of the species from southern Bengal. Only a single male individual was observed by AKN, found hanging from an open branch of a tree beside a pond in study site S1.

7. *Lathrecista asiatica* Fabricius, 1798

IUCN status: Least Concern (Dow & Kakkasery 2017)

Sighted on: 21.iv.2020, 30.vii.2020; Study site: S1

Comments: Both times single female individuals were sighted by AKN, from the study area. It is not so common in the region. It has widespread distribution throughout the state (Nayak et al. 2019c), however this is the first photographic report of the species from Paschim Bardhaman District.

8. *Neurothemis fulvia* (Drury, 1773)

IUCN status: Least Concern (Mitra 2010)

Sighted on: 23.ix.2017, 21.x.2020, 17.xii.2019, 12.viii.2020, 15.ix.2020, 18.xi.2020, 18.x.2020; Study



sites: S3, S12, S18, S19

Comments: This species can commonly be seen in some forested areas in Paschim Bardhaman District. During the study one female individual was sighted by AKN, from the study point S3. SR also found both male and female of this species frequently from study point S18. A male individual has also been sighted at S19 by SR. Sagar Adhurya, also sighted a female individual from S12. The authors acknowledge few more reports of its finding from outside the study area but inside the district (Nayak et al. 2019b).

#### 9. *Orthetrum chrysis* Selys, 1891

IUCN status: Least Concern (Subramanian 2010)

Sighted on: 07.xi.2013; Study site: S3

Comments: Previously the species was confused with *Orthetrum pruinosum* Burmeister, 1839 sub-adult male. Only a single male individual was sighted by AKN from the study area. Diagnostic characteristics are given by Fraser (1936) are as follows – frons bright scarlet colour, thorax ferruginous and abdomen bright blood red, wings with basal markings and extending to the first antenodal nerve. Wings hyaline, tinted with very pale brown. Female of the species without any basal markings, abdomen bright yellow-orange in colour (same for the sub-adult). The dark purplish-red, rather crimson than scarlet, tint of the abdomen, darker thorax and the abdomen more slender, gradually tapering rather than evenly broad to S7, well distinguished it from *O. pruinosum* male.

Suborder Zygoptera Selys, 1854

Family Lestidae Calvert, 1901

#### 10. *Lestes praemorsus* Hagen in Selys, 1862

IUCN status: Least Concern (Dow & Sharma 2020)

Sighted on: 21.xi.2018, 02.xi.2019; Study sites: S2, S15

Comments: SR observed six individuals both males and females flying around the study point S15. Weak agile flying and egg laying were observed during the study. Only one female individual was found by Arijit Mondal from a paddy field near S2. It prefers bushes and shaded areas.

Family Chlorocyphidae Cowley, 1937

#### 11. *Libellago indica* (Fraser, 1928)

IUCN status: Not assessed.

Sighted on: 22.x.2018, 02.xi.2018, 5.ix.2020; Study sites: S1, S14

Comments: Debdulal Banerjee observed a single female individual for the very first time on 22 October 2018 from south bank of Tumni River (S14), a tributary

of the Ajoy River. At first it was presumed to be *Libellago lineata* (Burmeister, 1839) on the basis of identification keys by Fraser (1934). On 2 November 2018, SR, guided and accompanied by Debdulal Banerjee, observed at least 20 individuals along 100m stretch of S14. Images of male, female, oviposition, copula and predation were captured. About two years later AKN found a single male individual from study point S1. In the dorsal photo of the male individual, the thick mid-dorsal dumbbell-shaped black marking in segment 2 and significantly broader mid-dorsal stripes in segments 3 to 5 compared to typical *L. lineata*, as mentioned by Fraser (1934) helped us conclude it as *L. indica*. Consultation with administrators of the 'Odonata of India' (Joshi et. al. 2020) helped the authors affirm that it should be *Libellago indica* (Fraser, 1928). Fraser (1928) described it from the type locality Pune (present Maharashtra) and also collected individuals from southern India, along the Western Ghats up to Kerala. Lahiri & Sinha (1991) extended the range eastwards to Bastar District (present Chhattisgarh State). Authors found recent distributional range extension reports of the species by Payra et al. (2020). These two papers extended its range up to Madhya Pradesh and Odisha, respectively. This paper confirms the extension of the species beyond the easternmost slope of the Chhotanagpur Plateau region (which is an extension of the Deccan Plateau) of West Bengal into the peninsulars. The authors found no previous report of *Libellago indica* (Fraser, 1928) from entire West Bengal. The present manuscript reports a range extension of the species from Odisha to West Bengal, which is also a new record for the state. Given the vast geographical range across the Deccan and Chhotanagpur Plateaus, *L. indica* also has shown considerable variations like *L. lineata*. The mid-dorsal black markings, in particular, though considerably thicker compared to the typical *L. lineata*, are narrower compared to the individuals found in the southern Western Ghats.

Family Coenagrionidae Kirby, 1890

#### 12. *Agriocnemis lacteola* Selys, 1877

IUCN status: Least Concern (Dow 2009)

Sighted on: 18.x.2020; Study sites: S17

Comments: Only one male individual was sighted by SR during field survey. According to the key provided by Fraser (1933), the male of this species is easily identifiable in the field by its characteristic white abdomen, completely unmarked with black. The type specimen is from 'Bengal'. Fraser (1933) had mentioned distribution of the species from Alipurduar (Hasimara) and Jalpaiguri districts of West Bengal. Prasad & Ghosh (1988) reported





collection of it from Purba Medinipur District. Payra & Tiple (2019) also reported the photographic record of this species from coastal area of Purba Medinipur District. Mukherjee et al. (2016) reported this species from Bankura District. Pal (2017) reported it from North Bengal University campus in Darjeeling District. There is also a recent photographic record of a male individual by SR from Jhargram District (Nayak et al. 2019a). The above records prove it to be quite widespread in West Bengal. The authors report the first photographic report of the species from Paschim Bardhaman District in this present paper.

### 13. *Pseudagrion australasiae* Selys, 1876

IUCN status: Least Concern (Dow 2009)

Sighted on: 03.x.2014, 21.xi.2018; Study sites: S6, S15

Comments: Commonly found from the study area along with other damselflies. Confusion arises in the field with *P. microcephalum* (Rambur, 1842) male, but the prominent view of male anal appendages can clear all doubts. It prefers bushes and marshes near shallow water bodies. Fraser (1933) and Srivastava & Sinha (1993) stated the diagnosis of the species along with distinguishing features to other species of same genus. For male, identification characteristics are - face, frons, vertex and occiput bluish-green, marked with black. Thorax azure blue on dorsum and sides marked with humeral and mid-dorsum broad black stripes. Prothorax is pale blue, the middle lobe on dorsum with black crown-shaped marking. Legs are pale blue. Small black spot on the lateral side of mesepimeron and a thicker spot on the upper end of lateral suture. Superior anal appendage half the length of abdomen 10, apically bifid, hooded strongly inward. And identification keys for female are dorsal markings on segments 2 and 8 very broad, extending the whole length of segments, that on 2 broads at the base. Segment 2 with a diamond- or cordate shaped subapical spot on dorsum connected finely to base and apex. This species has some similarity with *P. microcephalum*, but is distinguishable from same by elongate vase-shaped spot on abdominal segment – 2 instead goblet-shaped and in absence of basal spines. The thoracic black stripes are much wide in *P. australasiae*, and superior anal appendages shorter. The half circle mark at the mesepimeron in case of *P. australasiae*, whereas restricted to single dot in *P. microcephalum*. Comparison of the male's head & thorax; dorsum of thorax with three broad black bands, crown-shaped marking on the middle of prothorax, spots on and most importantly the male anal appendages, the superior anal appendages only half as long as segment

10; which differentiate this species from other species of *Pseudagrion* genus. Mitra & Babu (2010) reported its distribution from Howrah, Kolkata and North 24 Parganas districts, Srivastava & Sinha (1993) also reported its distribution from Birbhum District. Most recently Pal (2017) reported photographic record of it from North Bengal University campus, Darjeeling District. Both the author found this species from the study area. Hence this present manuscript claims first photographic record of the species from southern West Bengal.

## DISCUSSION

With the addition of these 13 newly recorded species from the study region, the total number of Odonata species stands at 76. Due to the geographical position of the region, a microclimatic variation can be noted (Choudhury et al. 2018; Gupta et al. 2019) and it reflects itself in the Odonata diversity of the region. Since this region represents one of the largest industrial and urban agglomerations in West Bengal (Choudhury et al. 2018), most of the water bodies and streams are highly polluted with industrial and domestic wastes (Dey et al. 1985; Banerjee & Gupta 2013). Since odonates are considered as biological indicator species (Clark et al. 1996; Corbett 1999; Catling 2005), it is necessary that other than diversity and abundance studies, a long-term monitoring needs to be taken up in the study region as well as in the state. We strongly believe that through continuous studies and long-term observation in more study points, new records for the state can be found from the region which will enrich the Odonata diversity of the state too, even we can describe some new species to science. We also believe that sustained and co-ordinated efforts are necessary for documenting the Odonata diversity of the state.

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Image 1. *Anax indicus* female, location – S14, 02.xi.2018.



Image 4. *Macromia cingulata* male, location – S1, 07.vii.2020.



Image 2. *Gynacantha cf. subinterrupta* male, location – S3, 24.vii.2013.



Image 5. *Macromia flavicincta* female, location – S16, 23.vi.2020.



Image 3. *Cyclogomphus heterostylus* male, location – S4, 19.vii.2015.

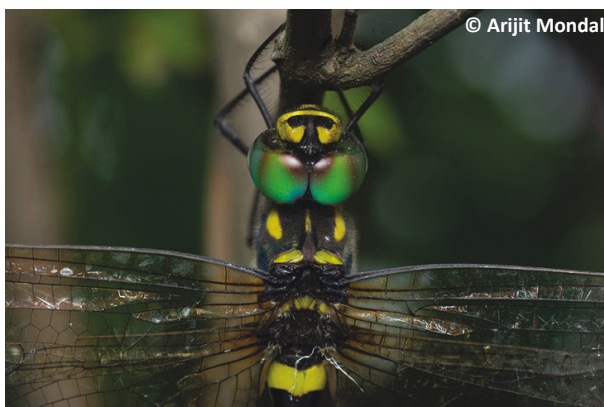


Image 5a. Head and Thorax of *Macromia flavicincta* unknown gender, location – S16, 02.viii.2018.





Image 6. *Hydrobasileus croceus* Brauer, 1867, male, location – S1, 05.ix.2020.



Image 9. *Orthetrum chrysus* male, location – S3, 07.xi.2013.



Image 7. *Lathrecista asiatica* female, location – S1, 21.iv.2020.



Image 10. *Lestes praemorsus* male, location – S15, 21.xi.2018.



Image 8. *Neurothemis fulvia* male, Location – S18, 18.xi.2020.



Image 11. *Agriocnemis lacteola* male Selys, 1877, location – S17, 18.x.2020.

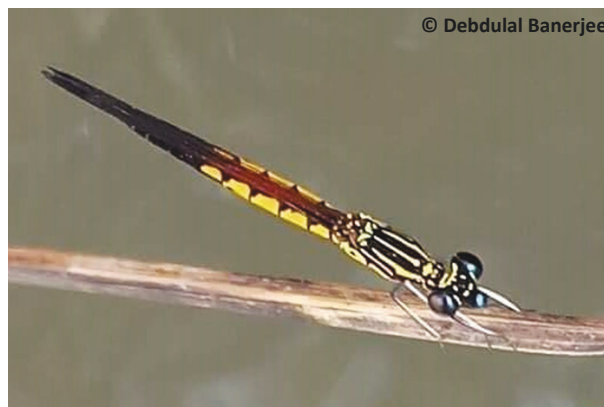




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Image 12. *Libellago indica* copula, location – S14, 02.xi.2018.

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Image 13. *Pseudagrion australasiae* male, location – S6, 03.x.2014.

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Image 12a. Dorsal view of male *Libellago indica*, location – S14, 02.xi.2018.

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