

**BIOSYSTEMATICS OF DAMSELFLIES (ZYGOPTERA:  
ODONATA) OF PAKISTAN**

**By**

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**A thesis submitted in the partial fulfillment of  
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## **Disclaimer**

**According to Article 8.2 of the International Code of Zoological Nomenclature, description of new species i.e *Indocnemis ahmedi* provided in this dissertation is not issued for public and permanent scientific record or for purposes of zoological nomenclature**

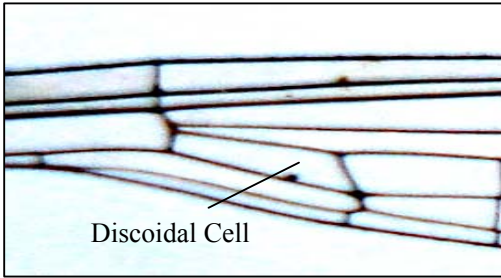
- \_\_\_ . Discoidal cell of forewing having its costal and lower sides equal or nearly equal (Fig 4.25a); tibiae in male somewhat dilated (Fig 4.25b).....**Platycnemidinae**

**Sub-Family Calicnemidinae**

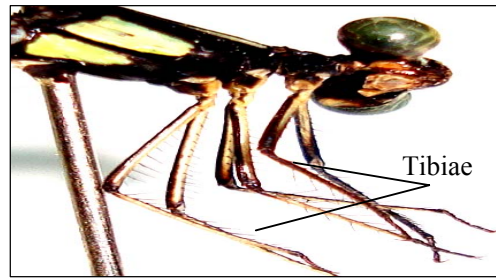
Two genera with two species are reported under this sub-family. A generic key has been prepared and given below.

**Key to the genera of Calicnemidinae**

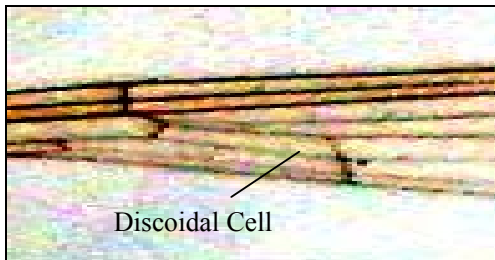
- 1. Petiolation of wings begins well proximal to ac (Fig 4.26a)..... **2**
- \_\_\_ . Petiolation of wings begins to the level of ac (Fig: 4.26b) .....**Coelliccia**
- 2. Only 3 cells present between the discoidal cell and nervure descending from subnode (Fig 4.26a).....**Calicnemis**
- \_\_\_ . More than 3 cells present between the discoidal cell and nervure descending from subnode (Fig 4.27).....**Indocnemis**



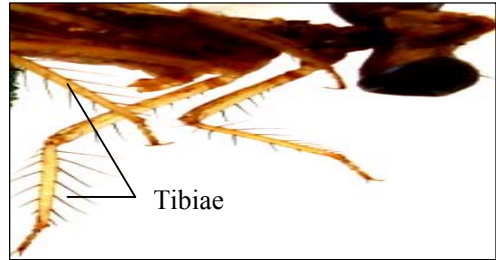
**Fig. 4.24a: Forewing of *Coellicia renifera***



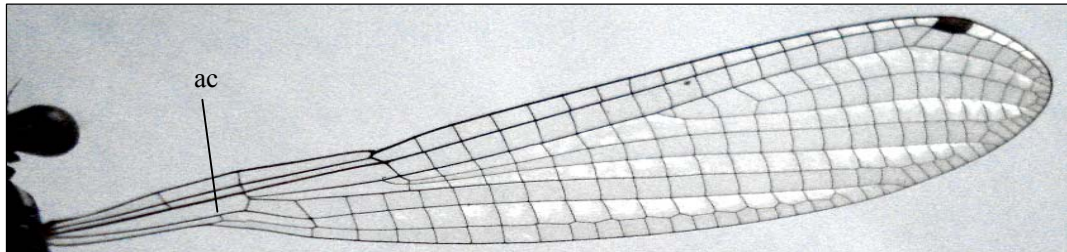
**Fig. 4.24b: Tibiae in *Coellicia renifera***



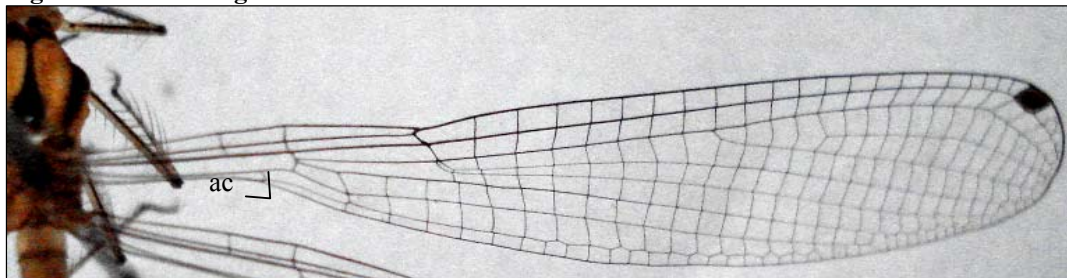
**Fig. 4.25a: Forewing of *Coper marginipes***



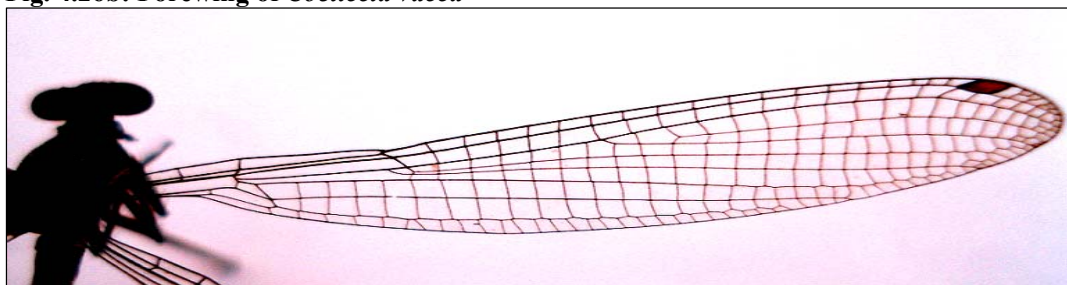
**Fig. 4.25b: Tibiae in *C. marginipes***



**Fig. 4.26a: Forewing of *Calicnemis eximia***



**Fig. 4.26b: Forewing of *Coellicia vacca***



**Fig. 4.27: Forewing of *Indocnemis ahmedi* sp. nov.**

**Genus *Indocnemis* Laidlaw, 1917**

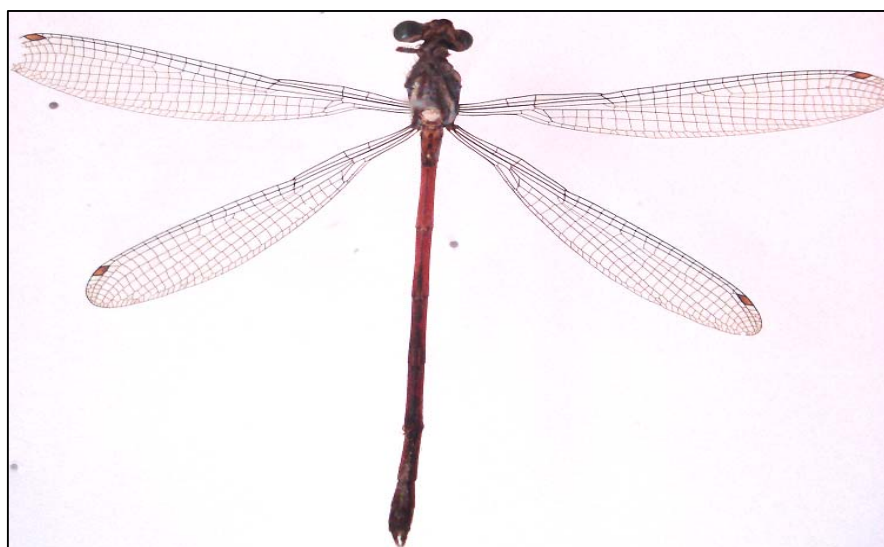
This genus is first time reported from Pakistan.

**1. *Indocnemis ahmedi* sp.nov.**

The species is a new addition to science and is first time reported through out world.



**Fig. 4.33: *Indocnemis ahmedi* sp. nov. (Dorsal View)**



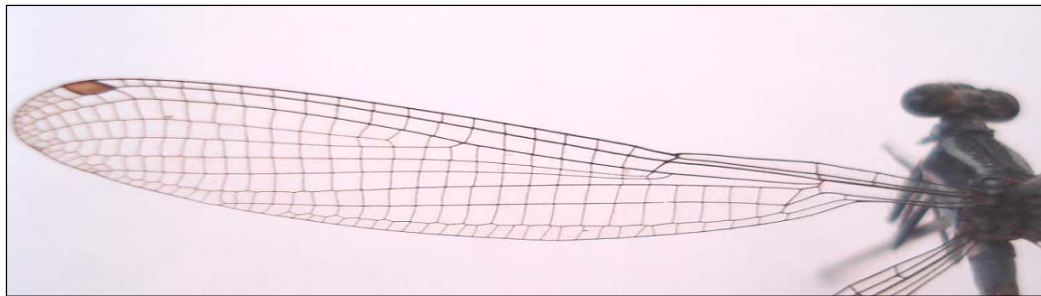
**Fig. 4.34: *I. ahmedi* sp. nov. (Ventral View)**



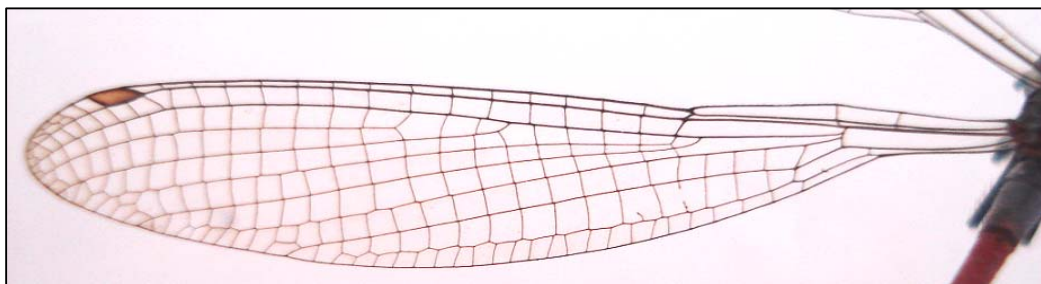
**Fig. 4.35** *I. ahmedi* sp. nov.  
(Lateral View)



**Fig. 4.36:** *I. ahmedi* sp. nov.  
(Anal appendages)



**Fig. 4.37:** *I. ahmedi* sp. nov. (Closeup of Forewing)



**Fig. 4.38:** *I. ahmedi* sp. nov. (Closeup of Hindwing)



**Fig. 4.39: *I. ahmedi* sp. nov.**  
(Closeup of thorax)



**Fig. 4.40: *I. ahmedi* sp. nov.**  
(Closeup of head)

Only males were collected from both the spots, female is still not known. Detail descriptions for collected specimens are as follows,

### **Diagnosis**

#### **Head:**

Frons dull black. Three yellow ocelli present on head and from each lateral ocellus, a very dull brown stripe goes towards antennal bases. Clypeus and post clypeus metallic black. However clypeus having anterior border yellowish. Genae metallic black with a patch of yellow on upper side. Labium: Brownish with outer border more darker. Labrum: Dark metallic black with a yellowish brown patch on its anterior and posterior margin. Mandibles brown. Labial and Maxillary palpi reddish brown in colour. Eyes: Black above, olivaceous below, having a green stripe which starts dorsally and ends posteriorly. Vertex black, a broad yellow stripe present on head behind eyes which starts a little disantl to outer border of eyes and ends a bit earlier to middle of head. Antennae and antennal socket black with each segment terminating in dark brown.

**Thorax:**

Black lobes on pronotum. Median lobe having white hairs on its margin. Anterior border of median lobe is elevated and is narrower than its posterior border. Posterior lobe of prothorax is naked with rounded margin. Propleuron and prosternum black.

**Pterothorax or Synthorax:**

Both mesonotum and metanotum are black. A broad yellow streak each on mesepimeron and metepimeron, both of which meet underneath thorax. The yellow streak on metepimeron is more broader than mesepimeron thereby reducing black color on metepimeron than red color.

The meso and meta sternum black but also having yellowish patches which are continuity of yellow streaks present on meso and metepimeron.

**Legs:**

Pro coxae and meso coxae are black with their lower side yellow however coxae of meta leg is yellowish. Remaining parts of legs are black having following characters, trochanter of proleg black ending in yellowish margin. Femora of proleg having a rounded yellow spot on it. Femora of meso and meta legs are reddish brown. Distal margin of tibiae, tarsus, all claws and spines of all legs are reddish black.

**Wings:**

Hyaline, slightly suffused with yellow which get a bit darker towards distal ends. Venation black. Pterostigma yellowish brown framed in black nervures covering more than 2 cells.

**Wing Venation:**

Postnodals in forewing, 17 – 19.

Postnodals in hindwing 14 – 16.



**Abdomen: Dorsal View:-**

Segment 1 and 2 black on dorsum with their connecting basal rings dull black in color. Segment 2 also having a dull red patch on its posterior end. Segment 3 and 4 reddish in color having a black spot on their anterior ends. A mid dorsal yellow line present, segments terminating in black basal rings. Segment 4 also possessing two dull black spots on sides of mid dorsal line. Segment 5 having similar spots but much lighter or dull in color. Segment 6 having only a single black spot on its anterior side. In addition, it also possesses a yellow patch at its posterior part. Segment 7 ending in black colour with much broad band. Segment 8, 9 and 10 are complete black however segment 8 having a red patch on its upper end. Basal ring of segment 8 is different from others and is yellowish in colour.

**Lateral View:**

Segment 1 yellow however segment 2 having red patches on it, segment 3 and 4 red, segment 4 having dull yellow tincture at its end. Segment 5 complete red, segment 6 red but also having yellow streaks near end. Segment 7 reddish having a black streak at its middle which get much broader towards end. Segment 8 more blacker than red. Segment 9 and 10 black. However 9 with a dull red patch on sides. Small white hairs are present on abdomen however the hairs get denser towards segments 7 – 10.

**Ventral View:**

Segment 1 and 2 black, 3 having yellow ground color. Anus black, with its tip again in yellow color. Segment 4 and 5 having a black patch at its anterior border. Underneath of abdomen is mostly crimson. The end of segment having black basal ring. Segment 6, 7 and 10 are more blackish than red. Segment 9 black with its basal rings red brown. However segment 10 is black with a patch of very dull red color. Segment 9 and 10 possess dense whitish hairs.

**Anal Appendages:** Dark reddish brown.

**Table 4.197: Measurement of abdomen and wings length of *Indocnemis ahmedi*.**

Character	No. of Specimens	Mean Length (mm)
Abdomen ♂	4	36.87 ± 0.25
Forewing ♂	3 *	29.50 ± 0.50
Hindwing ♂	3 *	27.33 ± 0.28

± Standard Deviation

\*Forewings and hindwings of one specimen was destroyed.

### Distribution Pattern

These damselflies were collected from N.W.F.P. and AJ&K. Distribution details along with ecological observations is given below.

**Table 4.198: Distribution of *Indocnemis ahmedi* sp. nov. in N.W.F.P.**

Material Examined					Ecological Observations			
District	Locality	♂	♀	Date	Climate	Lat.'	Long'.	Mean Temp.
Kohistan	Dasu	2	-	01-vi-2006	Sub-Humid & Arid	35-18	73-20	27.5 °C

**New Localities Added:** The above locality.

**Table 4.199: Distribution of *Indocnemis ahmedi* sp. nov. in AJ&K.**

Material Examined					Ecological Observations			
District	Locality	♂	♀	Date	Climate	Lat.'	Long'.	Mean Temp.
Muzaffar abad	Noseri	2	-	11- v- 2005	Sub-Humid	34-27	73-28	20 °C

**New Localities:** The above locality.

**New Record:** The species is a new to science record.

Specimens collected from both areas were compared statistically to observe difference in their body length.

**Table 4.200: Comparison of abdomen and wings length among specimens of *Indocnemis ahmedi* sp. nov. collected from N.W.F.P. and AJ&K.**

Collection	Mean Values (mm)		
	Abdomen	Forewing	Hindwing
N.W.F.P.	36.75	29.50	27.25
AJ&K	37.00	29.50	27.50

On Statistical comparison it was observed that the specimens of both areas differs non- significantly. Abdomen ( $F_{1,3} = 1.00$ ,  $P < 0.42$ ), forewing ( $F_{1,3} = 0.00$ ,  $P < 1.00$ ) and hindwing lengths ( $F_{1,3} = 0.33$ ,  $P < 0.66$ ).

**Habitat:** The species was found flying within dense vegetation. During collection from both spots it was noticed that it was found from the same spots as for those of *Calicnemis eximia*. At both spots vegetation was almost similar but spots differs from each other. In N.W.F.P. collection was done from roadside spot at which water was coming from uphill melted snow (The peaks of this area got covered with snow in winter season which ultimately melts during summer). The water was falling on road from a height of about 30ft with grasses hanging and grown around its way, yet it was coming from a very huge mountain peak (Fig 4.41). However in AJ&K, collection was done from moving water ways (Fig 4.42) which gets water as a result of snow, melted in summer. This spot was surrounded by dense long grassy vegetation. The area was provided with lot of springs. Snow water also mix up in this same water flow during summer.



**Fig. 4.41: Habitat for *Indocnemis ahmedi* sp. nov. in N.W.F.P.**



**Fig. 4.42: Habitat for *Indocnemis ahmedi* sp. nov. in AJ&K**

### **Sub-family Platycnemidinae**

A single genus under this subfamily was recorded.

#### **Genus *Copera* Kirby, 1890**

Two species were collected under this genus. A simple key for species is presented here.

##### **Key to the species of *Copera***

1. Frons and vertex in male with a broad bronzed black transverse band extended from eye to eye; two posterior pair of tibiae in male slightly expanded; posterior lobe of prothorax in female notched.....*marginipes*
- \_\_\_ . Frons and vertex in male without any transverse band; two posterior pair of tibiae in male widely expanded; posterior lobe of prothorax in female is simple but with a blunt teeth border..... *ciliata*

#### **1. *Copera ciliata* Selys, 1863**