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NEW DISTRIBUTIONAL RECORD OF COENAGRIONIDS (ODONATA : ZYGOPTERA : COENAGRIONIDAE) FROM HIMACHAL PRADESH, INDIA

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INTRODUCTION

The family Coenagrionidae is most successful one in the whole suborder Zygoptera. Species of this family have very much identical venation but wider differences in their general appearances, although they have similar behaviour resting with their wings closely apposed over the dorsum of the thorax. The Odonata fauna of Himachal Pradesh has been studied briefly by Fraser (1933) followed by Bhasin (1953), Kumar (1978, 1982 and 2005), Prasad (1976), Kumar and Prasad (1981), Chandra (1983) and Mitra (2003). Based on the earlier workers, 14 species belonging to six genera of the family Coenagrionidae are recorded from the state of Himachal Pradesh. The present paper deals with the results of recent surveys yielded 10 species under 6 genera of the family Coenagrionidae are new records for the state of Himachal Pradesh, and increased the list to 24 species under 9 genera. Among nine genera, three genera namely *Aciagrion* Selys, *Mortonagrion* Fraser and *Rhodischnura* Laidlaw have been reported for the first time from the State. This present communication is intended to report the extended distribution of Coenagrionids in the Himachal Pradesh.

The present study is based mainly on materials collected by the author during 2006-2007, except specimens of one species which were collected by Scientists of High Altitude Regional Centre, Zoological Survey of India, Solan and deposited in the National Zoological Collections of the Zoological Survey of India, Kolkata and Solan. The specimens were studied and compared with description provided by Fraser (1933). The classification is followed by Prasad and Varshney (1995) and Mitra (2002). Updated distribution of all these species in different states within India and countries outside India is also provided (Davies and Tobin, 1984; Tsuda, 2000).

SYSTEMATIC ACCOUNT

Order ODONATA

Suborder ZYGOPTERA

Superfamily COENAGRIONOIDEA

Family COENAGRIONIDAE

Genus *Aciagrion* Selys

1. *Aciagrion approximans* (Selys)

1876. *Pseudagrion microcephalum* race *approximans* Selys, *Bull. Acad. Belg.*, (2) **42** : 507.
1891. *Aciagrion approximans* Selys, *Ann. Mus. Civ. Genova*, (2) **10** (30) : 512.
1933. *Aciagrion approximans*, Fraser, *Fauna Brit. India, Odon.*, **1** : 342-344.
1995. *Aciagrion approximans*, Prasad and Varshney, *Oriental Insects*, **29** : 389.
2002. *Aciagrion approximans*, Mitra, *Mem. zool. Surv. India*, **19** (1) : 72.

Diagnostic characters : *Male* : Labium pale yellow; labrum pale blue, narrowly black at base; frons pale blue. *Prothorax* black on dorsum, pruinose on the sides. *Thorax* broadly black on dorsum to nearly as far lateral as the antero-lateral sutures, pruinose below. *Legs* white, femora black on extensor surface. *Wings* hyaline, pterostigma brownish, paler at circumference. *Abdomen* : segments 1-7 broadly black on dorsum; laterally segment 1 overloaded with pruinescence, segment 2 with pale blue or bluish green, segments 3-7 with pale blue; segments 8 and 9 azure blue; segment 10 entirely black. *Anal appendages* black; superiors as long as segment 10. *Female* : Similar to male in colouring and markings; *Thorax* greenish-blue at sides, as well as the narrow antehumeral stripes. *Abdominal* segments 1-7 similar to male, segments 8 and 9 black on the dorsum, segment 10 azure blue.

Material examined : India : Himachal Pradesh : Hamirpur : Sujampur : Tihra Water Tank, 2♂, 19.04.2006,

Sujanpur : Beas River left bank, 1♂, 1♀, 20.04.2006, Coll. R. Babu.

Distribution : India : Himachal Pradesh, Arunachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Uttar Pradesh and West Bengal.

Remarks : This species is reported for the first time from the outside of Eastern India.

2. *Aciagrion azureum* Fraser

1932. *Aciagrion azureum* Fraser, *Mem. Dept. Agri. India (Ent.)*, 7(7) : 51.

1933. *Aciagrion azureum*, Fraser, *Fauna Brit. India, Odon.*, 1 : 339-340.

1995. *Aciagrion azureum*, Prasad and Varshney, *Oriental Insects*, 29 : 390.

2002. *Aciagrion azureum*, Mitra, *Mem. zool. Surv. India*, 19(1) : 73.

Diagnostic characters : *Male* : Labium whitish; labrum and frons pale yellow. *Prothorax* black on dorsum, pale blue laterally. *Thorax* broadly black on dorsum, laterally pale blue changing to pale yellow on the sides and beneath. *Wings* hyaline, pterostigma reddish brown. *Abdomen* : segment 1 azure blue with black spot; segment 2 blue at the sides with broad black band on dorsum; segments 3-7 with broad black dorsal stripes; segments 8-10 azure blue without any black markings. *Anal appendages* carneous or palest blue tipped with black.

Material examined : India : Himachal Pradesh : Hamirpur : Sujanpur : Beas River left bank, 1♂, 20.04.2006, Coll. R. Babu; Una : Rampur Kandi nallah, 1♂, 23.04.2006, Coll. R. Babu.

Distribution : India : Himachal Pradesh and Assam.

Elsewhere : Myanmar.

Remarks : This species is reported for the first time from the outside of Assam (Eastern India).

3. *Aciagrion pallidum* Selys

1891. *Aciagrion pallidum* Selys, *Ann. Civ. Genova*, (2) 10(30) : 512.

1933. *Aciagrion pallidum*, Fraser, *Fauna Brit. India, Odon.*, 1 : 344-345.

1995. *Aciagrion pallidum*, Prasad and Varshney, *Oriental Insects*, 29 : 390.

2002. *Aciagrion pallidum*, Mitra, *Mem. zool. Surv. India*, 19(1) : 72.

Diagnostic characters : *Male* : Labium white; labrum pale brown; frons pale carneous, almost white. *Prothorax* brown on dorsum except anterior lobe, which is pale blue. *Thorax* brown on dorsum, slightly extended pale blue antehumeral stripe on dorsum and similar one lying midway between the lateral sutures,

white beneath. *Legs* white. *Wings* hyaline, pointed at apices, pterostigma pale brown. *Abdomen* long and slender, dilating at the end; segment 1 very pale blue with black spot on dorsum; segment 2 with a broad black apical ring and white laterally; segments 3-7 similar to 2 but white laterally; segments 8-10 pale azure blue, unmarked. *Anal appendages* carneous. *Female*: Similar to male but only differences in the dorsal markings of the abdomen: segments 1 and 2 blue at the sides, segment 2 with an arrow-head marking on dorsum in the halo of reddish brown; segments 3-7 reddish brown on dorsum bordered with black; segments 8-10 almost white, sometimes pinkish or palest blue; segment 9 with two black basal points.

Material examined : India : Himachal Pradesh: Hamirpur : Sujanpur : Tihra Water Tank, 5♂, 6♀, 19.04.2006, Coll. R. Babu; Kangra: Palampur: Holta, HPKVK Fish Farm, 1♂, 14.04.2006; Ranital, 1♂, 28.09.2007, Coll. R. Babu; Chamba : Ravi Riverside, 2♂, 1♀, 21.09.2007, Coll. R. Babu.

Distribution : India : Himachal Pradesh, Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Goa, Jharkhand, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal.

Elsewhere : Cambodia, Myanmar, Nepal, Taiwan, Thailand and Vietnam.

Genus *Agriocnemis* Selys

4. *Agriocnemis clauseni* Fraser

1922. *Agriocnemis clauseni* Fraser, *Mem. Dept. Agric. India (Ent.)*, 7 : 53-55.

1933. *Agriocnemis clauseni*, Fraser, *Fauna Brit. India, Odon.*, 1 : 390-392.

1995. *Agriocnemis clauseni*, Prasad and Varshney, *Oriental Insects*, 29 : 391.

2002. *Agriocnemis clauseni*, Mitra, *Mem. zool. Surv. India*, 19(1) : 81.

Diagnostic characters : *Male* : Labium yellow; labrum turquoise blue with base narrowly black; frons black except at the sides. *Prothorax* black on dorsum and sides. *Thorax* black on dorsum as far as lateral as midway between the humeral and lateral suture. *Legs* pale blue. *Wings* hyaline; pterostigma pale yellow, centered with greyish, framed in thick black nervures. *Abdomen*: azure blue, marked with black on segments 1-6, segment 7 blue; segments 8-10 entirely black. *Anal appendages* blue. *Female* : Similar to male : without any black at base of labrum. *Wings* with deeper yellow pterostigma. *Abdomen* : segments 1 and 2 deep azure blue, 3-7 bluish-green, 8-10 entirely black.

Material examined : India : Himachal Pradesh : Shimla: Rampur: Badrash, 2♂, 1♀, 19.10.2006, Coll. R. Babu.

Distribution : India : Himachal Pradesh, Arunachal Pradesh, Assam, Meghalaya, Uttarakhand, Uttar Pradesh and West Bengal.

Elsewhere : Bangladesh, Myanmar, Nepal and Thailand.

5. *Agriocnemis splendidissima* Laidlaw

1919. *Agriocnemis splendidissima* Laidlaw, *Rec. Indian Mus.*, **16** : 181-182.
 1933. *Agriocnemis splendidissima*, Fraser, *Fauna Brit. India, Odon.*, **1** : 392-394.
 1995. *Agriocnemis splendidissima*, Prasad and Varshney, *Oriental Insects*, **29** : 391.
 2002. *Agriocnemis splendidissima*, Mitra, *Mem. zool. Surv. India*, **19**(1) : 81.
 2007. *Agriocnemis splendidissima*, Emiliyamma *et al.*, *Rec. zool. Surv. India, Occ. Paper No.*, **269** : 42-43.

Diagnostic characters : *Male* : Labium yellow; labrum pale blue; frons black. *Prothorax* black on dorsum, palest blue on lower part of sides. *Thorax* black on dorsum as far as the anterolateral suture, marked with narrow blue or pinkish antehumeral stripes. *Legs* carneous. *Wings* hyaline; pterostigma black, framed finely in pale brown or yellow. *Abdomen* blue, marked with black: segment 1 with whole of dorsum black; 2 with broad dorsal marking; segments 3-7 with a broad dorsal black stripe; segments 8-10 black, 8 and 9 with a small lateral blue spot. *Anal appendages* black. *Female*: Very similar to male in colour and markings. Labrum pale green; dorsum of thorax black not extending as far laterally; pterostigma golden yellow.

Material examined : India : Himachal Pradesh : Una : Rampur Kandi nallah, 2♂, 2♀ (1 pair on copulation), 23.04.2006, Rampur Suwah Riverside, 1♂, 24.04.2006, Coll. R. Babu.

Distribution : India : Himachal Pradesh, Andhra Pradesh, Assam, Chhattisgarh, Goa, Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Pakistan.

Remarks : This species is reported for the first time from Northern India.

Genus *Enallagma* Charpentier

6. *Enallagma parvum* Selys

1876. *Enallagma parvum* Selys, *Bull. Acad. Belg.*, (2) **41** : 537.
 1933. *Enallagma parvum*, Fraser, *Fauna Brit. India, Odon.*, **1** : 376-378.

1995. *Enallagma parvum*, Prasad and Varshney, *Oriental Insects*, **29** : 390.

2002. *Enallagma parvum*, Mitra, *Mem. zool. Surv. India*, **19**(1) : 76.

Diagnostic characters : *Male* : Labium white; labrum pale sky blue; frons pale blue. *Prothorax* broadly black on dorsum, sides pale blue. *Thorax* black on dorsum, broad azure blue antehumeral stripe bordered with black; laterally pale blue fading to white. *Legs* white with black line on the extensor surface of femora. *Wings* hyaline; pterostigma yellow in immature forms, blackish in adults. *Abdomen* pale sky blue, marked with black. Segment 1 with broad dorsal spot and narrow blue apical annule; whole length of segment 2 marked black; segments 3-7 with fine apical annules; segment 8-10 azure blue, segment 10 with black stripe on the middorsum. *Anal appendages* black. *Female* : In Isochrome female the ground colour of thorax greenish-yellow paling to pale blue; antehumeral stripe bordered with more broadly black, incase of heterochrome female the antehumeral stripes unenclosed with black. *Abdomen* with dorsal black stripes broader; segment 8-10 broadly black on dorsum, latter side of 10th segment blue.

Material examined : India : Himachal Pradesh : Kullu : Manikaran, Dhunkrah, 1♂, 1♀, 12.04.2006, Coll. R. Babu; Kangra : Palampur : COVAS Fish Farm, 2♀, 16.04.2006, Coll. R. Babu; Hamirpur : Sujampur : Tihra Water Tank, 8♂, 5♀ (1 pair on copulation), 19.04.2006, Coll. R. Babu; Una : Rampur Suwah riverside, 1♂, 2♀, 22.04.2006, Coll. R. Babu; Solan : Sadhupool : Ashwini Khud, 1♀, 10.09.2007, Coll. R. Babu; Shimla : Kupvi, 2♀, 12.09.2007, Coll. R. Babu.

Distribution : India : Himachal Pradesh, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Jharkhand, Manipur, Maharashtra, Meghalaya, Orissa, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh and West Bengal.

Elsewhere : Myanmar, Nepal, Pakistan, Sri Lanka and Thailand.

Genus *Mortonagrion* Fraser

7. *Mortonagrion aborense* (Laidlaw)

1914. *Agriocnemis aborensis* Laidlaw, *Rec. Indian Mus.*, **8** : 347.
 1933. *Agriocnemis aborensis*, Fraser, *Fauna Brit. India, Odon.*, **1** : 394-395.
 1989. *Mortonagrion aborense*, Hämäläinen, *Indian Odonatol.*, **2** : 1-4.
 1995. *Mortonagrion aborense*, Prasad and Varshney, *Oriental Insects*, **29** : 391.
 2002. *Mortonagrion aborense*, Mitra, *Mem. zool. Surv. India*, **19**(1) : 83.

Diagnostic characters : Male : Labium pale yellow; labrum pale blue; frons blue outwardly, black in centre. *Prothorax* black on dorsum except anterior lobe, which is pale blue. *Thorax* black on dorsum as for as the antero-lateral suture, marked with narrow pale blue antehumeral stripe. *Legs* creamy white. *Wings* hyaline; pterostigma blackish-brown. *Abdomen* : segment 1 dorsum black, sides and apical border azure blue; segment 2 with dorsum broadly black except near apical end; segments 3-6 black with narrow greenish blue lateral stripes; segment 7 with a pair of basal blue dorsal spots only; segment 8 azure blue in ventral side; segment 9 entirely blue; segment 10 azure blue. *Anal appendages* black.

Material examined : India : Himachal Pradesh : Solan : Ashwinikhud, 2♂, 10.09.2007, Coll. R. Babu.

Distribution : India : Himachal Pradesh, Assam, Mizoram and West Bengal.

Elsewhere : Indonesia and Thailand.

Remarks : This species is reported for the first time from the outside of Eastern India.

Genus *Pseudagrion* Selys

8. *Pseudagrion hypermelas* Selys

1876. *Pseudagrion hypermelas* Selys, *Bull. Acad. Belg.*, (2) 42 : 519.
 1907. *Pseudagrion bidentatum*, Mortan, *Trans. Ent. Soc. Lond.*, : 307.
 1933. *Pseudagrion hypermelas*, Fraser, *Fauna Brit. India, Odon.*, 1 : 289-292.
 1995. *Pseudagrion hypermelas*, Prasad and Varshney, *Oriental Insects*, 29 : 389.
 2002. *Pseudagrion hypermelas*, Mitra, *Mem. zool. Surv. India*, 19(1) : 62.

Diagnostic characters : Female : Labium creamy white; labrum palest brown; frons pale olivaceous. *Prothorax* palest ochreous. *Thorax* pale olivaceous, with mid-dorsal carina and humeral suture mapped out in black. *Legs* carneous. *Wings* hyaline; pterostigma uniform yellow. *Abdomen*: Pale greenish-yellow on the basal half, palest blue on the distal segments, marked with black on dorsum. *Anal appendages* pale brown.

Material examined : India : Himachal Pradesh : Sirmour : Renuka Lake, 1♀, 09.10.2006, Coll. R. Babu.

Distribution : India : Himachal Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Punjab, Uttar Pradesh and West Bengal.

Elsewhere : Pakistan.

Remarks : This species is reported for the first time from the Western Himalaya.

9. *Pseudagrion microcephalum* (Rambur)

1842. *Agrion microcephalum* Rambur, *Ins. Névropl.*, : 259.

1876. *Pseudagrion microcephalum*, Selys, *Bull. Acad. Belg.*, 2(42) : 504.
 1933. *Pseudagrion microcephalum*, Fraser, *Fauna Brit. India, OdonM.*, 1 : 278-280.
 1954. *Pseudagrion microcephalum*, Lieftinck, *Treubia*, 22 (suppl.) : 57.
 1995. *Pseudagrion microcephalum*, Prasad and Varshney, *Oriental Insects*, 29 : 389.
 2002. *Pseudagrion microcephalum*, Mitra, *Mem. zool. Surv. India*, 19(1) : 61.
 2007. *Pseudagrion microcephalum*, Emiliyamma *et al.*, *Rec. zool. Surv. India, Occ. Paper No.* 269 : 29-30.

Diagnostic characters : Female : Head and upper surface of eyes with bright orange. *Prothorax* bluish-green. *Thorax* bluish-green, richly suffused with golden orange on dorsum especially in the humeral area, laterally azure blue. *Wings* hyaline; pterostigma paler brown. *Abdomen* : azure blue, marked with black : segment 1 with a quadrate spot; segment 2 with thick black mark dumbbell shaped; segment 8 with a black band; segment 9 with a bifid spot and segment 10 deeply and narrowly notched at apex.

Material examined : India : Himachal Pradesh : Kangra : Palampur : Holta, HPKVK Fish Farm 1♀, 14.04.2006, Coll. R. Babu; Hamirpur : Sujampur : Tihra Water Tank, 2♀, 19.04.2006, Coll. R. Babu.

Distribution : India : Himachal Pradesh, Andaman & Nicobar Islands, Andhra Pradesh, Assam, Goa, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Australia, Bangladesh, China, Hong Kong, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Singapore, Solomon Islands, Sri Lanka, Taiwan, Thailand and Vietnam.

Remarks : This species is reported for the first time from the Western Himalaya.

Genus *Rhodischnura* Laidlaw

10. *Rhodischnura nursei* (Morton)

1907. *Ischnura nursei* Morton, *Trans. Ent. Soc. Lond.*, : 306-307.
 1919. *Rhodischnura nursei*, Laidlaw, *Rec. Indian Mus.*, 16 : 171, 177.
 1933. *Rhodischnura nursei*, Fraser, *Fauna Brit. India, Odon.*, 1 : 369-371.
 1995. *Rhodischnura nursei*, Prasad and Varshney, *Oriental Insects*, 29 : 391.
 2002. *Rhodischnura nursei*, Mitra, *Mem. zool. Surv. India*, 19 (1) : 76.

Diagnostic characters : Male : Labium bright yellow; labrum and frons pale greenish yellow. *Prothorax* broadly black on dorsum, pale greenish yellow on sides. *Thorax* broadly black on dorsum, narrow green

antehumeral stripes, laterally green, paling to yellow. *Legs* pale yellow. *Wings* hyaline; pterostigma proximal part in forewings black, costal pale yellow; red in the inner half changing to pink and hyaline; pterostigma in hindwing hyaline. *Abdomen* : Segments 1-4 bright crimson, segment 1 with two dorsal black spots; segments 5 and part of 6 with pale citron-yellow which some times become reddish; from part of segment 6 to 10 black. *Anal appendages* reddish or ochreous. *Female* : Similar to male but markings differing as follows : In isochromatic form sides of thorax yellow, stripes on the upper parts changing to rich ochreous; in heterochromatic form antehumeral stripes pale bluish green, dorsal black limited by the antehumeral stripes. *Abdomen* : In isochromatic female middorsal carinal black line on segment 2; segment 6 ochreous; ventral borders of segment 7-10 ochreous. In heterochromatic form black on the dorsum on all segments.

Material examined : India : Himachal Pradesh : Mandi : Bijni Bridge, 1 ♀, 19.09.1984, Coll. Kangruram; Pandoh, 5 ♂, 1 ♀, 20.08.1986, Coll. R.K. Sharma & Subhash; Kangra : Talwara Lake, 1 ♂, 07.12.1987, Coll. V.P. Uniyal & Kangruram.

Distribution : India : Himachal Pradesh, Andhra Pradesh, Bihar, Chhattisgarh, Delhi, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Orissa,

Punjab, Rajasthan, Uttarakhand, Uttar Pradesh and West Bengal.

Elsewhere : Bangladesh and Pakistan.

SUMMARY

A list of ten species under six genera of family Coenagrionidae (Zygoptera) constituting the first record from Himachal Pradesh State, along with necessary collection data and their distribution, has been provided. The distribution of three genera *Aciagrion* Selys, *Mortonagrion* Fraser and *Rhodischnura* Laidlaw are new records to Himachal Pradesh. Three species *Aciagrion approximans* (Selys), *Aciagrion azureum* Fraser, and *Mortonagrion aborensis* (Laidlaw) are reported for first time from the outside of Eastern India. *Agriocnemis splendidissima* Laidlaw, *Pseudagrion hypermelas* Selys, and *Pseudagrion microcephalum* (Rambur) have been recorded for the first time from the Western Himalaya Region.

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