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Dragonflies and damselflies (Insecta: Odonata) of Nagaland, with an addition to the Indian odonate fauna

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Abstract: We surveyed odonates in the districts of Kohima, Peren and Wokha in the state of Nagaland, northeastern India, during April and May 2012 and May 2013. We recorded 69 species, including 43 additions to the known odonates of Nagaland, and one addition—*Calicnemia erythromelas* Selys, 1891—to the Indian odonate fauna. The known odonate fauna of Nagaland now consists of 90 species in 53 genera and 14 families. We also describe for the first time the female of *Coeliccia schmidti*, and partially, a heterochromatic form of the female *Ischnura mildredae*.

Keywords: Anisoptera, Indo-Burmese Biodiversity Hotspot, northeastern India, species inventories, Zygoptera.

Nagaland is one of the seven northeastern states of India with a geographical area of 16,527km^2, of which approximately 56% is forested (Forest Survey of India 2009). Of these, forests on only 222km^2, or 1.34% of the state's geographical area, are protected as the state's only national park and three wildlife sanctuaries (Forest Survey of India 2009), the remaining majority lie on community-owned land. As part of the globally recognized Indo-Burmese Biodiversity Hotspot, Nagaland boasts remarkable faunal and floral diversity,

Merogomphus martini

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including many rare, endemic and legally protected species of megafauna and largely undocumented components of insect and plant biodiversity (Grewal et al. 2012). Due to remoteness, biodiversity of Nagaland had been understudied until recently. The state is now considerably accessible, attracting many ecologists and conservation biologists. In the past few years, biodiversity surveys in Nagaland have revealed an impressive concentration of species of national and international conservation importance (Grewal et al. 2012).

Any comparative work involving historical information on Nagaland biodiversity along with the current distribution and state of biodiversity faces a peculiar challenge. Until statehood was conferred in 1963, Nagaland was part of the erstwhile state of Assam, which at that time covered most of northeastern India that is now divided into seven states. Hence, most of the historical (mostly British) records were generally subsumed under "Assam", and only in rare cases were specific localities mentioned. Specific locality records are potentially available from many specimen labels, which have not been studied very well with reference to modern state and national boundaries in this part of the Indian Subcontinent. Therefore, the exact distribution of species in these states is currently poorly documented, especially for invertebrates. This problem is particularly acute for dragonflies and damselflies (Insecta: Odonata), which have not been surveyed extensively in northeastern India. Fraser (1933, 1934, 1936) mentioned Naga Hills when characterising the distribution of several species. Since then, Mitra (2002) has done the most comprehensive work on odonates of northeastern India, including a review of all the existing literature. Lahiri (1987, 1977) made notable contributions to odonates of Meghalaya and Manipur. The most recent and complete work is by Subramanian (2009), who presented a taxonomically updated checklist of Indian odonates. Nonetheless, much work needs to be done in northeastern India, and we especially require specific locality and bionomic information. The present paper is an effort at providing important information on the natural history, distributions, and status of odonates of Nagaland.

Materials and Methods

We opportunistically surveyed odonates on random walks along forest paths, roads and streams in the districts of Kohima, Peren and Wokha in Nagaland (Table 1, Image 1). We photographed specimens for

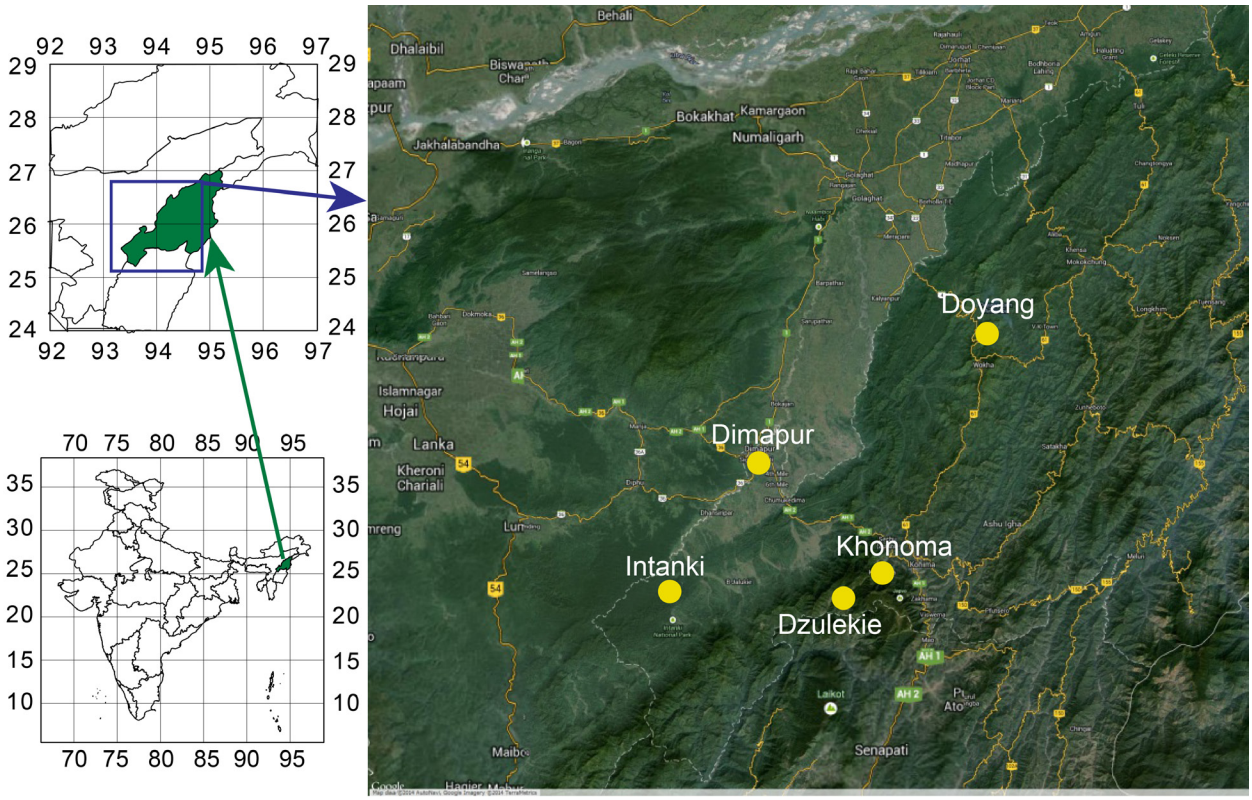

Image 1. A reference map of India with the study localities highlighted

Table 1. Details of the survey localities in Nagaland.

	Locality	GPS co-ordinates	District	Dates visited	Altitude	Habitat	No. of species
1.	Doyang	26°22'N &94°25'E	Wokha	9–11 May 2013	1,300–1,400 m	Lowland tropical semi-evergreen forest	16
2.	Dzulekie	25°37'N & 93°57'E	Kohima	6–12 May 2012	1,700–2,400 m	Temperate semi-evergreen and evergreen forest with bamboo and cane	7
3.	Intanki (=Intangki)	25°45'N, 93°31'E	Peren	15–18 May 2012	125–190 m	Lowland tropical semi-evergreen forest	52
4.	Khonoma	25°38'N & 94°2'E	Kohima	4–5 May 2012; 12–18 May 2013	1,400–2,000 m	Temperate evergreen forest	18

Table 2. Details of the voucher specimens mentioned in this paper, all deposited in the Research Collections Facility at the National Center for Biological Sciences, Bengaluru, India

Species	Sex	Date of collection	Locality	Accession Number
Chloropetalia selysi	Female	14 May 2013	Khonoma	NCBS-AE273
Chloropetalia selysi	Male	14 May 2013	Khonoma	NCBS-AE275
Burmagomphus hashimaricus	Male	20 May 2013	Intanki NP	NCBS-AE297
Burmagomphus hashimaricus	Female	24 May 2013	Intanki NP	NCBS-AE326
Merogomphus martini	Male	10 May 2013	Wokha	NCBS-AE224
Merogomphus martini	Male	12 May 2013	Wokha	NCBS-AE241
Merogomphus martini	Male	12 May 2013	Wokha	NCBS-AE244
Stylogomphus sp.	Male	12 May 2013	Wokha	NCBS-AE240
Ceriagrion rubiae	Male	24 May 2013	Intanki NP	NCBS-AE325
Ischnura mildredae	Male	13 May 2013	Khonoma	NCBS-AE252
Ischnura mildredae	Female	13 May 2013	Khonoma	NCBS-AE258
Ischnura mildredae	Female	14 May 2013	Khonoma	NCBS-AE265
Ischnura mildredae	Male	14 May 2013	Khonoma	NCBS-AE266
Ischnuramildredae	Female	14 May 2013	Khonoma	NCBS-AE267
Calicnemia erythromelas	Male	17 May 2013	Khonoma	NCBS-AE285
Elattoneura coomansi	Male	20 May 2013	Intanki NP	NCBS-AE294
Elattoneura coomansi	Female	20 May 2013	Intanki NP	NCBS-AE298
Elattoneura coomansi	Female	20 May 2013	Intanki NP	NCBS-AE299

various identification features in the field. We took voucher specimens where necessary after obtaining required research and collecting permits for protected areas of the state from the Department of Forests, Ecology, Environment and Wildlife, Government of Nagaland (permit no. CWL/GEN/240/522-39), and permission from local village councils on community land. Voucher specimens (Table 2) are deposited in the Research Collections Facility at the National Center for Biological Sciences (NCBS), Bengaluru, India. We identified these specimens mainly with the help of keys provided by Fraser (1933, 1934, 1936), Laidlaw (1950), Asahina (1967, 1984), Vick (1986), Mitra (2002), and Nair (2011). We followed odonate taxonomy and binomial names by Subramanian (2009), except for *Chloropetalia* Carle, 1995 in place of *Chlorogomphus* Selys, 1854 (Schorr & Paulson 2009), and *Aristocypha* Laidlaw, 1950 and *Heliocypha* Fraser, 1949 instead of *Rhinocypha* Rambur, 1842 (as used in Subramanian 2014). Family classification followed Subramanian (2014) and Dijkstra et al. (2013).

Results and Discussion

We recorded 68 odonate species from 13 familes and from 54 genera; from Nagaland, including 42 species previously not reported from the state, and one species—*Calicnemia erythromelas* Selys, 1891—is an addition to the Indian odonate fauna (Table 3). We also observed *Ceriagrion rubiae* Laidlaw, 1916 in Intanki, which is the first formal record of the species from northeastern India. The known odonate fauna of Nagaland now consists of 90 species classified in 53

Table 3. Checklist of Odonata of Nagaland. Localities: 1 - Doyang; 2 - Dzulekie; 3 - Intanki; 4 - Khonoma. Column 5 indicates species recorded by Mitra et al. (2006) but not recorded by us. The last column lists species recorded by Mitra et al. (2006). Species new to Nagaland are marked with asterisks (*). The only species new to India (*Calicnemia erythromelas*) is in bold letters).

	Species Name	1	2	3	4	5	Mitra et al. 2006
	Aeshnidae						
1	*Anax nigrofasciatus* Fraser, 1935					+	+
2	*Gynacantha bainbriggei* Fraser, 1922*	+		+			
3	*Gynacantha bayadera* Selys, 1891					+	+
	Chlorogopmhidae						
4	*Chloropetalia selysi* Fraser 1929*				+		
	Cordulegasteridae						
5	*Anotogaster nipalensis* Selys, 1854*				+		
	Genera IncertaeSedis						
6	*Idionyx stevensi* Fraser, 1924*				+		
	Gomphidae						
7	*Burmagomphus hasimaricus* Fraser, 1926*			+			
8	*Merogomphus martini* (Fraser, 1922) *				+		
9	*Stylogomphus* sp.*				+		
10	*Paragomphus lineatus* (Selys, 1850) *			+			
11	*Nepogomphus modestus* (Selys, 1878)					+	+
	Libellulidae						
12	*Acisoma panorpoides* Rambur, 1842			+			+
13	*Brachydiplax chalybea* Brauer, 1868*			+			
14	*Brachydiplax sobrina* (Rambur, 1842)			+			+
15	*Brachythemis contaminata* (Fabricius, 1793)	+		+			+
16	*Camacinia gigantea* (Brauer, 1867)					+	+
17	*Cratilla lineata* Foerster, 1903*	+		+			
18	*Crocothemis servilia* (Drury, 1770)	+	+	+	+		+
19	*Diplacodes trivialis* (Rambur, 1842)	+		+			+
20	*Diplacodes nebulosa* (Fabricius, 1793) *			+			
21	*Lathrecista asiatica* (Fabricius, 1798)					+	+
22	*Lyriothemis bivittata* (Rambur, 1842) *			+			
23	*Neurothemis intermedia* (Rambur, 1842)			+			+
24	*Neurothemis fulvia* (Drury, 1773)	+		+			+
25	*Neurothemis tullia* (Drury, 1773)			+			+
26	*Onychothemis testacea* Laidlaw, 1902*			+			
27	*Orthetrum glaucum* (Brauer, 1865)			+			+
28	*Orthetrum japonicum* (Uhler, 1858)	+	+		+		+
29	*Orthetrum luzonicum* (Brauer, 1868)			+			+
30	*Orthetrum pruinosum* (Burmeister, 1839)	+	+	+	+		+
31	*Orthetrum sabina* (Drury, 1770)			+			+
32	*Orthetrum taeniolatum* (Schneider, 1845)					+	+
33	*Orthetrum triangulare* (Selys, 1878)	+	+		+		+
34	*Palpopleura sexmaculata* (Fabricius, 1787)			+			+
35	*Pantala flavescens* (Fabricius, 1798)	+	+	+	+		+
36	*Potamarcha congener* (Rambur, 1842)			+			+
37	*Rhyothemis plutonia* Selys, 1883*			+			
38	*Rhyothemis variegata* (Linnaeus, 1763) *			+			
39	*Tetrathemis platyptera* Selys, 1878*			+			

	Species Name	1	2	3	4	5	Mitra et al. 2006
40	*Tholymis tillarga* (Fabricius, 1798)			+			+
41	*Tramea basilaris* (Palisot de Beauvois, 1805) *			+			
42	*Trithemis aurora* (Burmeister, 1839) *	+		+	+		
43	*Trithemis festiva* (Rambur, 1842) *			+			
44	*Trithemis pallidinervis* (Kirby, 1889)			+			+
	Calopterygidae						
45	*Caliphaea confusa* Hagen in Selys, 1859*		+		+		
46	*Echo margarita* Selys, 1853					+	+
47	*Matrona nigripectus* Selys, 1879*			+			
48	*Neurobasis chinensis* (Linnaeus, 1758)			+			+
	Chlorocyphidae						
49	*Libellago lineata* (Burmeister, 1839) *			+			
50	*Heliocypha biforata* Selys, 1859*			+			
51	*Heliocypha perforata* Selys, 1879					+	+
52	*Aristocypha quadrimaculata* Selys, 1853	+					+
53	*Aristocypha spuria* Selys, 1879					+	+
54	*Aristocypha trifasciata* Selys, 1853					+	+
	Coenagrionidae						
55	*Aciagrion approximans* (Selys, 1876)				+		+
56	*Aciagrion occidentale* Laidlaw, 1919*			+			
57	*Aciagrion pallidum* Selys, 1891*			+			
58	*Agriocnemis lacteola* Selys, 1877*			+			
59	*Agriocnemis femina* (Brauer, 1868) *			+			
60	*Agriocnemis pygmaea* (Rambur, 1842)				+		+
61	*Ceriagrion coromandelianum* (Fabricius, 1798)			+			+
62	*Ceriagrion fallax* Ris, 1914*				+		
63	*Ceriagrion praetermissum* Lieftinck, 1929					+	+
64	*Ceriagrion olivaceum* Laidlaw, 1914*			+			
65	*Ceriagrion rubiae* Laidlaw, 1916*			+			
66	*Ischnura aurora* (Brauer, 1865)			+			+
67	*Ischnura senegalensis* (Rambur, 1842)					+	+
68	*Ischnura rufostigma* Selys, 1876					+	+
69	*Ischnura mildredae* Fraser, 1927*				+		
70	*Mortonagrion aborense* (Laidlaw, 1914)*			+			
71	*Pseudagrion australasiae* Selys, 1876					+	+
72	*Pseudagrion rubriceps* Selys, 1876	+		+			+
73	*Onychargia atrocyana* (Selys, 1865)					+	+
	Euphaeidae						
74	*Anisopleura comes* Hagen, 1880					+	+
75	*Euphaea masoni* Selys, 1879					+	+
	Lestidae						
76	*Indolestes cyaneus* (Selys, 1862) *		+				
77	*Lestes dorothea* Fraser, 1924*			+			
	Lestes praemorsus Hagen in Selys, 1862*			+			
78	**Platycnemididae**						
79	*Calicnemia eximia* (Selys, 1863)					+	+
80	*Calicnemia imitans* Lieftinck, 1948*	+					

	Species Name	1	2	3	4	5	Mitra et al. 2006
81	***Calicnemia erythromelas* (Selys, 1891)***				+		
82	*Calicnemia pulverulans* (Selys, 1886)					+	+
83	*Coeliccia didyma* (Selys, 1863)	+					+
84	*Coeliccia vacca* Laidlaw, 1932					+	+
85	*Coeliccia schmidti* Asahina, 1984*			+			
86	*Copera ciliata* (Selys, 1863) *			+			
87	*Copera superplatypes* Fraser, 1927					+	+
88	*Copera marginipes* (Rambur, 1842) *			+			
89	*Elattoneura coomansi* Lieftinck, 1937*			+			
	Platystictidae						
90	*Protosticta himalaica* Laidlaw, 1917*				+		

Table 4. A taxonomic summary of odonates of Nagaland

Sub-order Anisoptera		
Family	**Genus**	**No. of species**
Aeshnidae		3
	Anax	1
	Gynacantha	2
Corduliidae		1
	Idionyx	1
Cordulegasteridae		1
	Anotogaster	1
Chlorogopmhidae		1
	Chloropetalia	1
Gomphidae		5
	Davidius	1
	Merogomphus	1
	Burmagomphus	1
	Paragomphus	1
	Nepogomphus	1
Libellulidae		33
	Acisoma	1
	Brachydiplax	2
	Brachythemis	1
	Camacinia	1
	Cratilia	1
	Crocothemis	1
	Diplacodes	2
	Lathrecista	1
	Lyriothemis	1
	Neurothemis	3
	Onychothemis	1
	Orthetrum	7
	Palpopleura	1
	Pantala	1
	Potamarcha	1
	Rhyothemis	2
	Tetrathemis	1
	Tholymis	1
	Tramea	1
	Trithemis	3
	Total	**44**

Sub-order Zygoptera		
Family	**Genus**	**No. of species**
Calopterygidae		4
	Caliphaea	1
	Echo	1
	Matrona	1
	Neurobasis	1
Chlorocyphidae		6
	Libellago	1
	Aristocypha	3
	Heliocypha	2
Coenagrionidae		20
	Aciagrion	3
	Agriocnemis	3
	Ceriagrion	5
	Ischnura	4
	Mortonagrion	1
	Pseudagrion	2
	Onychargia	1
Euphaeidae		2
	Anisopleura	1
	Euphaea	1
Lestidae		3
	Indolestes	1
	Lestes	2
Platycnemididae		11
	Calicnemia	4
	Coeliccia	3
	Copera	3
	Elattoneura	1
Platystictidae		1
	Protosticta	1
	Total	**46**

genera and 14 families (Table 3, also summarized in Table 4). Among the taxonomic categories, the genus *Orthetrum* was well-represented with seven species, while 36 of the 54 genera were represented with a single species, and the family Libeluilidae topped the list with 36 species (Table 4). Among Gomphidae, the species mentioned as "*Stylogomphus* sp." remains unidentified. It is distinct from the only *Stylogomphus* (*S. inglisi* Fraser, 1922) that is reported from India (Subramanian 2009).

We provide below our notes on the distribution, identification and status of a selection of species of special interest, e.g., Data Deficient species and others that have seldom been reported in literature, in the taxonomic order in which they appear in Table 3. This information may be useful when these species are assessed in the future by IUCN and other international and national conservation agencies. We also provide first descriptions of the female of *Coeliccia schmidti* and partially, a heterochromatic form of the female of *Ischnura mildredae*.

1. *Chloropetalia selysi* Fraser, 1929 (Chlorogomphidae) (Image 2): IUCN Red List status: Vulnerable (Dow 2009a).

The only record of this species from India, which is now more than 80 years old, was by Fraser (1936): "two males taken in company with *C. preciousus* (Fraser, 1924) and *C. atkinsoni* (Selys, 1878c) at Mungpoo [Darjeeling District], 3600ft., May 1927." Vick (1985) and St. Quentin (1970) added their records from Nepal: "According to Vick, in Nepal the species is "not necessarily rare but is hard to catch and probably missed altogether by non-specialists". "The lack of recent records from India is likely to reflect a lack of expert sampling in Darjeeling over the last 70 years." (Dow 2009a). We recorded three individuals of this species: one male and a pair in copula, at Khonoma, Nagaland, on 14 May 2013. This species is rather easy to identify as it has segments 9–10 unmarked and segments 3–4 with two pairs of lunules, apical and postjugal.

2. *Burmagomphus hasimaricus* Fraser, 1926 (Gomphidae) (Image 2): IUCN Red List status: Data Deficient (Mitra 2010b).

The genus *Burmagomphus* Williamson, 1907 is represented in India by five species (Subramanian 2009). A male and a female of this species were observed in Intanki National Park. The teneral male was seen among grass adjoining the Intanki River which was more than 3.6m wide. The female was seen sitting on vegetation at a height of around 2.7m. This species has not been recorded from India for 90 years since the type series was collected from Hasimara, West Bengal. The only other record is from Pokhara, Nepal (Vick 1985). Our record from Intanki extends the range of this species eastward by over 500km and suggests that this species may occur in other northeastern states and northern Myanmar.

3. *Merogomphus martini* (Fraser, 1922)(Gomphidae) (Image 2): IUCN Red List status: Near Threatened. (Dow 2009c).

This gomphid was observed in Khonoma and Doyang. The abundance of *M. martini* in Khonoma was significantly greater in May 2013 than in May 2012: only one male was seen in 2012 while more than 17 males were seen in 2013. Adults were often seen resting on vegetation near small streams in the mountains. No female was observed, indicating their secretive habits or genuine rarity.

4. *Matrona nigripectus* Selys, 1879 (Calopterygidae) (Image 3): The genus *Matrona* Selys, 1853 has proven to be much more speciose than previously thought (Zhang & Hämäläinen 2012). Currently, seven species are known (Schorr & Paulson 2009). SJ observed several males and females of this species at Intanki NP in forested areas lurking in the shade, on 15–18 May 2012.

5. *Aciagrion occidentale* Laidlaw, 1919 (Coenagrionidae) (Image 5): IUCN Red List status: Least Concern (Mitra 2010a).

This species has been reported from Sri Lanka, India, Cambodia, Thailand and Vietnam (Mitra 2010a), although some Indochinese records may be misidentified as *A. borneese*. From India it is recorded from several localities in southern and central India, and recently from Odisha (previously Orissa; Nair 2011). In the original description of this species, under the name "*Aciagrionhisopa* (Selys) ? race *occidentalis*", from Castle Rock, N. Kanara District, Bombay; Parambiculam, Cochin State; Trichur, Cochin State) Laidlaw (1919) stated that it is "characterised by having a black triangle on the dorsum of the eight abdominal segment, with its apex directed towards the end of the segment, and extending nearly to the full length of the segment". However, in his later review of the genus, referring to males of this species from Cochin and Ceylon, he made the following correction (Laidlaw 1924: 6): "My description states that the black mark on segment eight of the abdomen has its apex directed toward the hinder end of segment. This should read "directed towards the base of the segment". He also provided a drawing with a triangle at the segment apex directed towards its base, and also with a black mark at S10 (Laidlaw, 1924: Fig. 16). The pattern of S7 and S10 corresponds to *Aciagrion paludense* Fraser, 1922, considered by a

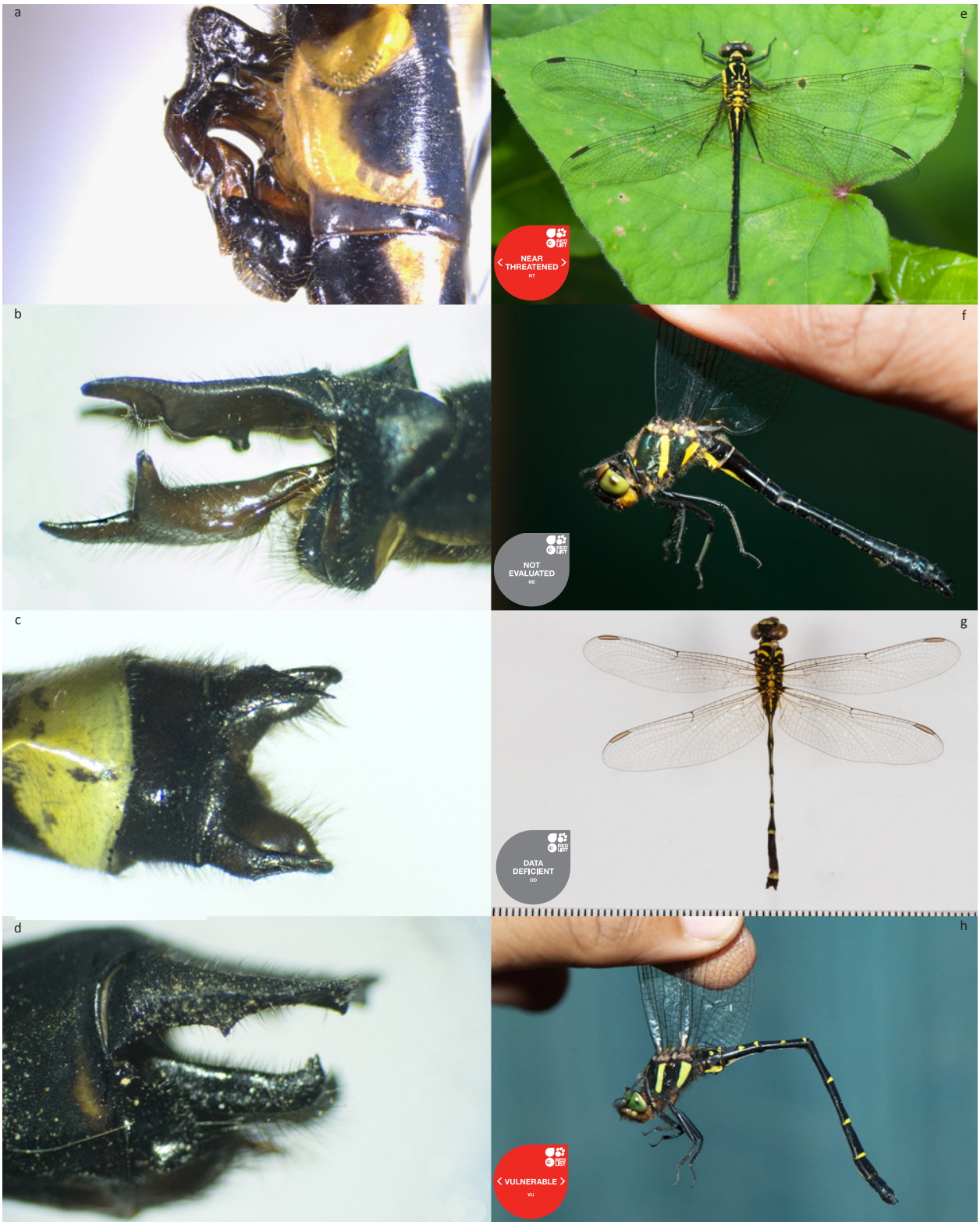

Image 2 a–h. Odonata of Nagaland. (Families: Gomphidae, Genera Incertaesedis and Chlorogomphidae).
a - the secondary genetalia of the male; b–d - anal appendages; (e–h - adult male) e - *Merogomphus martini*; f - *Idionnyx stevensi*; g - *Burmagomphus hasimaricus*; h - *Chloropetalia selysi*. © Shantanu Joshi

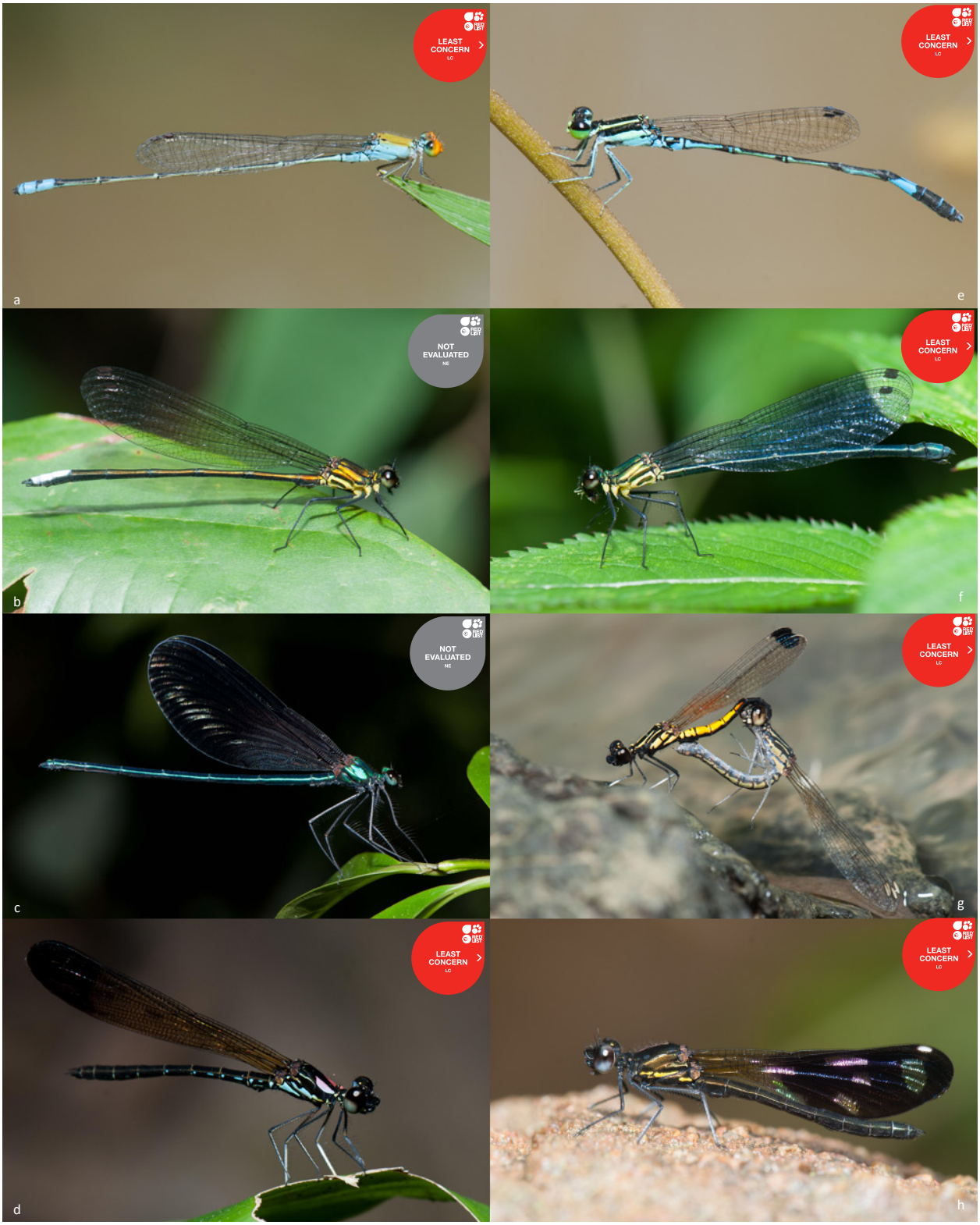

Image 3. Odonata of Nagaland. Families: Coenagrionidae, Calopterygidae and Chlorocyphidae
a - *Pseudagrion rubriceps*; b - *Caliphaea confuse* male; c - *Matrona nigriceptus*; d - *Heliocypha biforata*; e - *Mortonagrion aborense*; f - *Caliphaea confusa* female; g - *Libellago lineata* copula; h - *Aristocypha quadrimaculata.* © Shantanu Joshi

junior synonym of *A. occidentale* (Laidlaw 1924; Fraser 1933). In Intanki NP on 24 May 2013 SJ recorded an *Aciagrion* male with S7 having a black triangle directed to the end of the segment (Image 5), as in the original description of *occidentale* by Laidlaw (1919). This fact made us suppose that this description was correct and the later correction by Ladilaw (1924) was based on other specimens, with the opposite direction of the triangle. The enigma with two types of the S7 black triangle in Aciagrion spp. is to be investigated. It is not excluded that two species are in fact involved, named *A. occidentale* and *A. paludense*, respectively. For the time being we use for our specimen the name *A. occidentale* which anyway corresponds to the original description by Laidlaw (1919).

6. *Ceriagrion rubiae* Laidlaw, 1916 (Coenagrionidae) (Image 5): IUCN Red List status: Not assessed.

This *Ceriagrion* species has a very interesting disjunct distribution. It occurs in the Western Ghats and in Tamil Nadu (Babu et al. 2013), but has been reported once from Koraput in the Eastern Ghats, Odisha (Srivastava & Das 1987). SJ recorded dozens of specimens of this species around paddyfields and ponds just outside Intanki National Park in May 2013. Several pairs in copulae were also observed ovipositing on aquatic vegetation. This is a range extension for the species by several hundred kilometers, and the first record from northeastern India. The male of this species can be easily separated from the similar *C. praetermissum* (Lieftinck) by its green eyes, longer abdomen and non-bifid inferior appendages (Asahina 1967).

7. *Ischnura mildredae* Fraser, 1927 (Coenagrionidae) (Images 4, 5): IUCN Red List status: Not assessed.

This species, and possibly the species group, has rather been neglected by most authors. There is considerable uncertainty about the taxonomic status of several species in this group. According to Vick (1986), "Asahina 1970 placed *carpentieri*, *annandalei* in synonomy with *mildredae*, which he considered as a sub-species of *rufostigma*, considering that the colour pattern differences were due to individual variation and states of maturity of the available material. This decision was followed by Davis & Tobin (1984). However, this analysis does not take into account the structural differences that exist between these four taxa". Vick (1986) provided several diagrams and explanations to treat these four taxa as distinct species, an arrangement that we are following here. Later, Asahina (1991) downgraded *mildredae* back to subspecies, noting that none of the isochromatic females that he studied had a "large bluish spot on dorsum of the segment 8" as noted by Fraser (1933). In our specimens, most females had a small pale spot on segment 8, but never blue as Asahina had noted. We don't think that this character alone is sufficient to treat *mildredae* as a subspecies. We found this species to be very common around ponds in Khonoma in May 2013. We saw several dozen specimens at a small pond that was used to breed fishes, where several pairs in copulae were also observed. These specimens closely matched the images and descriptions by Fraser (1933) and Vick (1986). All the males had a small blue spot on segment 8 that is characteristic of *I. mildredae*. Fraser (1933) and Vick (1986) did not mention a heterochromatic form for this species. However, we observed several females of a heterochromatic form, which was similar to the heterochromatic forms of related species, and may be described as follows (also see Images 4, 5): prothorax and thorax broadly black on dorsum. A broad, blackish-brown dark band present between the eyes. Segments 3–10 dorsally black, with pale annules. Segment 2 with a characteristic marking shaped like a mushroom on the dorsal side towards the end of the segment.

Image 4. Heterochromatic female of *Ischnura mildredae*
a - lateral; b close-up of the second Abdominal Segment; c - dorsal
© Shantanu Joshi

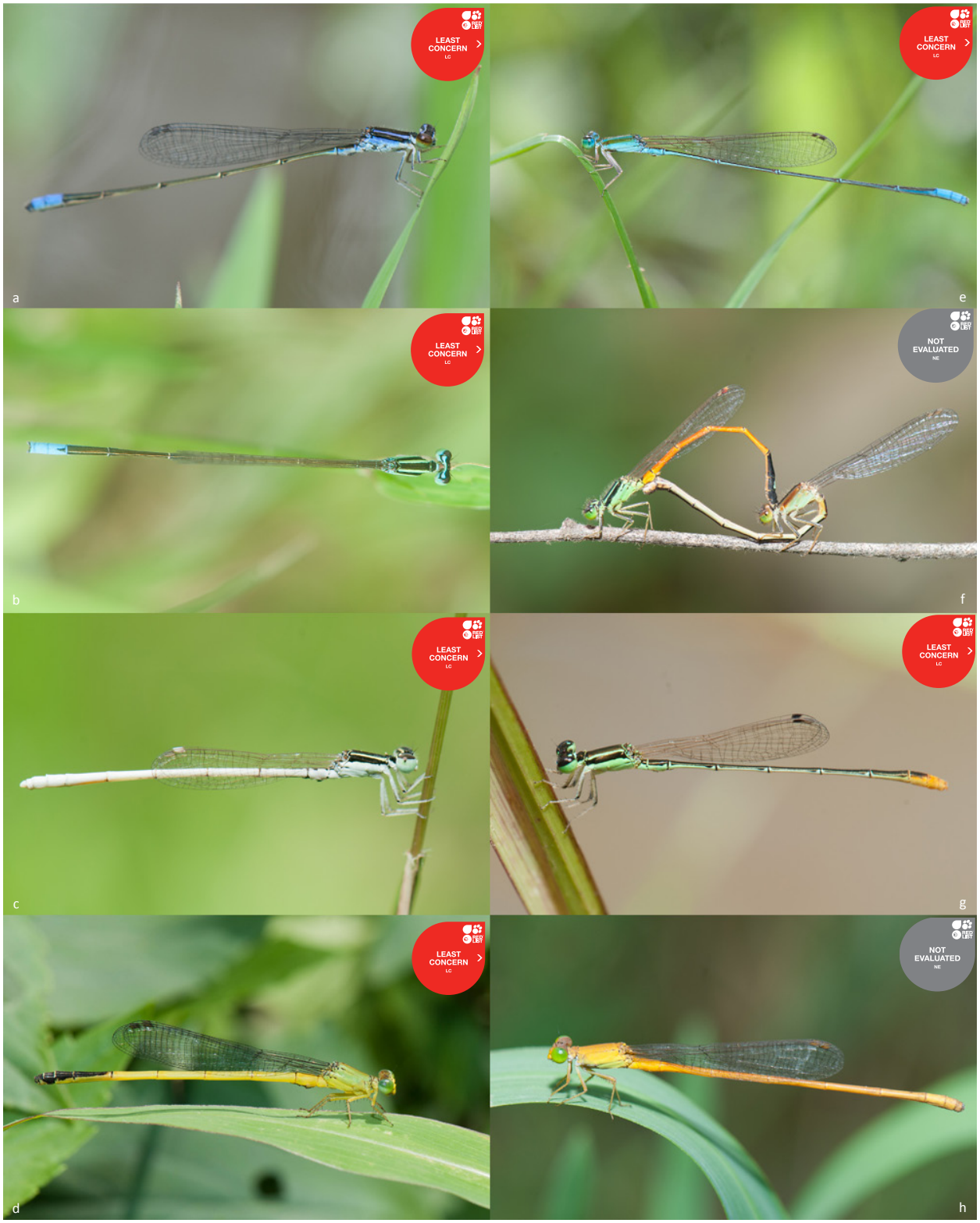

Image 5. Odonata of Nagaland. Family: Coenagrionidae
a - *Aciagrion approximans;* b - *Aciagrion occidentale*; c - *Agriocnemis pieris*; d - *Ceriagrion fallax*; e - *Aciagrion pallidum*; f - *Ischnura mildredae*; g - *Agriocnemis femina*; h - *Ceriagrion rubiae*. © Shantanu Joshi

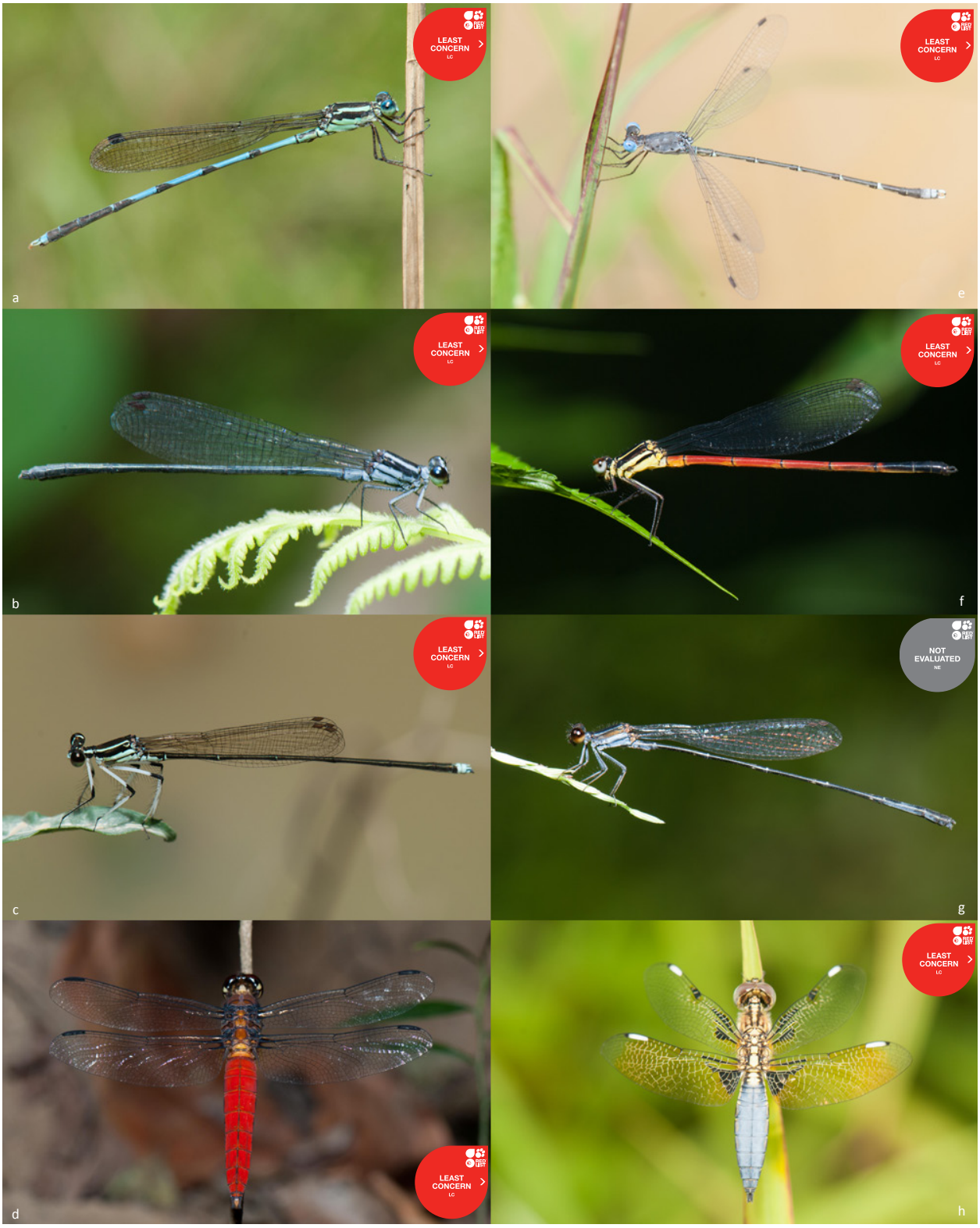

Image 6. Odonata of Nagaland. Families: Lestidae, Platycnemididae and Libellulidae
a - ***Indolestes cyaneus***; b - ***Calicnemia imitans***; c - ***Copera ciliata***; d - ***Lyriothemis bivittata***; e - ***Lestes praemorsus***; f - ***Calicnemia erythromelas***; g - ***Elattoneura coomansi***; h - ***Palpopleura sexmaculata***. © Shantanu Joshi

8. *Indolestes cyaneus* Selys, 1862 (Lestidae) (Image 6): IUCN Red List status: Least Concern (Dow 2009b).

This species has been previously reported in India from Punjab and Simla eastward to Tiger Hills in Darjeeling, and outside in Nepal, Bhutan and Taiwan (Mitra 2002; Dow 2009b). However, it has not yet been formally reported from northeastern India. We observed it in Dzulekie on a tar road from Dzulekie to Benreu but did not find it elsewhere. Males were more commonly encountered than females: seven males and only two females were seen on 4 May 2012. Fraser (1933) had found this species breeding in "swift cold mountain-streams", whereas we observed two pairs in copulae ovipositing in a small puddle adjacent to the tar road, at a considerable distance from the forest streams.

9. *Calicnemia erythromelas* Selys, 1891 (Platycnemididae) (Image 6): IUCN Red List status: Least Concern (Wilson 2009).

This species has so far been recorded from Thailand (Hämäläinen & Pinratana 1999), Vietnam (Asahina 1997), China (Sui & Sun 1984) and Myanmar (Fraser 1933). Its type locality is Leiktho, Toungoo District, Myanmar, and Fraser recorded it from several other localities in Myanmar. However, there have not been any prior records from India, and it was not listed among Indian odonates by Subramanian (2009). We recorded one male of this species in Khonoma on a cloudy day on the road from Khonoma to Mezoma on 17 May 2013. Our record represents an addition to the Indian odonate fauna, and the first record of the species from the Myanmar-northeastern Indian region in several decades. However, it is unsurprising to find this species in Nagaland, which adjoins Myanmar, and we suspect that more records will turn up as this area is further surveyed in the future.

10. *Coeliccia schmidti* Asahina, 1984 (Platycnemididae) (Image 7): IUCN Red List status: Data Deficient (Dow 2009d).

This species was described from "Chabong, Khunou, Manipur-Staat, 1200 ft." (Asahina 1984), which is presumably near Imphal, Manipur. SJ observed several individuals at Intanki NP between 15 and 18 May 2012. Unfortunately, all the voucher specimens were destroyed by ants, so we have no specimens to study now. The following observations are based on SJ's photographs and field notes. The characters differing from Asahina's description are given below for the male, and the female is described here for the first time.

Male: Distal half of segment nine and the whole of segment 10 bright yellow, not reddish-brown as mentioned by Asahina (Asahina's description of the color may be ascribed to post-mortem changes). Anal appendages are yellow, the structure matching illustrations in the original species description by Asahina. The color of the paraproct apex was variable: three specimens showed dark apices, two did not.

Female: Head: Vertex with a series of six pale blue spots: two between the anterior and the outer ocelli, two narrowly separated from the spots between the anterior and the outer ocelli and extending on the outer ocelli, and two spots on the outside of the outer ocelli. Eyes: black above, brilliant blue below. The spots on the posterior side of the head are large, similar to the male. Thorax: Prothorax: broadly citron-yellow. Posterior lobe citron-yellow above, black on sides. Pterothorax: two narrow pale blue antehumeral stripes, which gradually turn pale yellow posteriorly in some specimens while remaining pale blue in others (exact data on number of specimens of each type is unavailable due to loss of specimens as mentioned before). Mesepimeron and areas below citron yellow. Abdomen: blackish-brown for most part, pale brown below. Segments 2–8 with paired faint brown spots on dorsum. Segments nine and 10 fully yellow. Anal Appendages: black, short, like in the other female *Coeliccia*.

Distinguishing Characters: *Coeliccia* is a fairly large and complex genus, with 11 species so far known from

Image 7. *Coeliccia schmidti* Asahina, 1984. a - male; b - female; c- in copula. © Shantanu Joshi

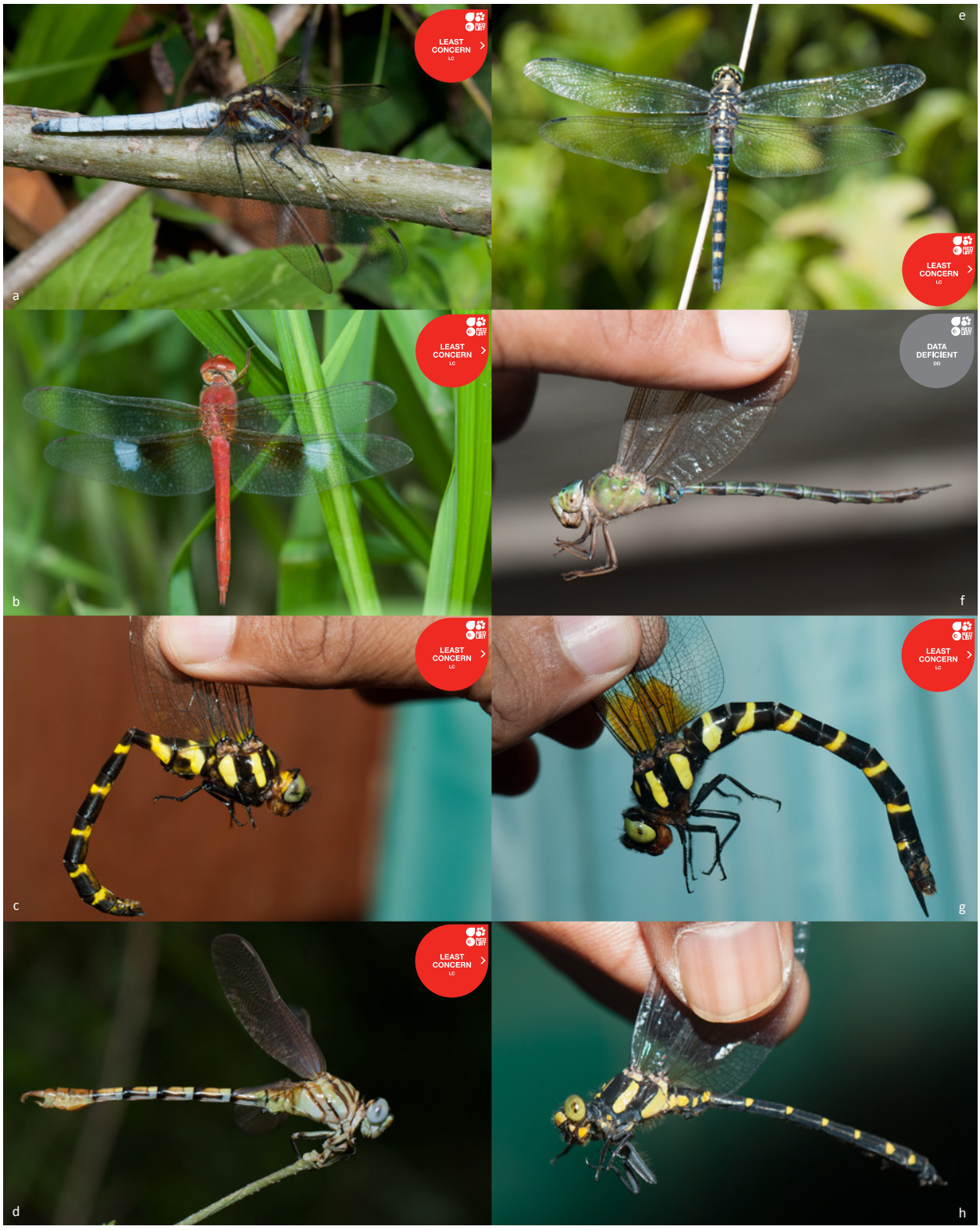

Image 8. Odonata of Nagaland. Libellulidae, Aeshnidae, Cordulegasteridae and Gomphidae.
a - *Orthetrum japonicum;* b - *Tholymis tillarga;* c - *Anotogaster nipalensis* male; d - *Paragomphus lineatus;* e - *Onychothemis testacea;* f - *Gynacantha bainbriggei;* g - *Anotogaster nipalensis* female; h - *Stylogomphus* sp. © Shantanu Joshi

India (Subramanian 2009). Without re-assessment of old specimens and studies of fresh material, a satisfactory key to this genus cannot be made. However, from the information currently at hand, the males of this species can be separated from other *Coeliccia* species by very large pale spots on dorsum of thorax and four small spots in the ocellar region. Female has a completely yellow prothorax which separates it from females of all Indian *Coeliccia* except for *C. fraseri* Laidlaw, 1932 and *C. renifera* (Selys, 1886). Of these, *C. fraseri* has segments nine and 10 black and *C. renifera* has segment 10 black, unlike in *C. schmidti* where both the segments are bright yellow. *C. schmidti* resembles *C. renifera* and *C. loogali* Laidlaw, 1932 in having six spots in the ocellar region.

11. *Elattoneura coomansi* Lieftinck, 1937 (Platycnemididae) (Image 7): IUCN status: Not assessed.

The distribution of this species is not well known, very few records have been published, and nothing is known about its habits. Prasad & Varshney (1995) gave the distribution as "India". We observed several males and females of this species at Intanki National Park, including many pairs in copulae that were ovipositing in the submerged vegetation at Intanki River.

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