



DRAGONFLY DIVERSITY AND CONSERVATION IN TOEBAY RONGCHHU WATERSHED, PUNAKHA BHUTAN

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Presentation outline:

- Introduction
- Study area
- Dragonfly biology
- Habitat diversity
- Dragonfly diversity
- Threats to habitat
- Conservation issues
- References

Introduction: *Importance of dragonflies*

Dragonfly Biology: (1) *Taxonomy*

Class: Insecta

Order: Odonata

Suborder:

1. Zygoptera (*Damselflies*)
2. Anisoptera (*True Dragonflies*)
3. Anisozygoptera (*Damsel-dragonflies*)

(2 & 3 clubbed together under Anisoptera or new name Epiprocta)

(Source: Kalkman et al., 2008)

(2)LIFE CYCLE

- **Incomplete metamorphosis:**
 - **Egg**- round or fusiform, pale yellow in colour
 - **Larva**- varied form but has modified labium called mask;
 - zygoptera larva abdomen long and slender and terminating in 3 (rarely 2) leaf or sac like caudal gills;
 - anisoptera larva abdomen short and stout, caudal gills absent and terminating in five short spine-like processes
 - **Adult (imago)**- consists of head, prothorax, thorax and abdomen (10 segments), 2 membranous wings and six legs on thorax

Adult (cont.)

Zygoptera

- broad head with widely separated eyes
- similar fore and hind wings
- most species rest with wings closed



Anisoptera

- larger and more robust & in most families the eyes touch on top of the head
- hind wings are distinctly broader at their base than the fore wings
- most species spread their wings at rest



Emergence of adult from larva at Baritsho RBP

Teneral emerged from larval exuvia (*Crocothemis s. servilla*)



Head emerging from larval exuvia



Ceriongrion fallax cerinomelas mating pair
at Sopsokha pond



Unique features of dragonfly:

- among the most ancient of winged insects capable of flying both forward & backward
- mechanism of indirect sperm transfer: sperm produced in the testes (at the abdomen tip); the secondary copulatory organs that transfer sperm lie on the ventral side of the abdomen base.
- strongly modified labium of the larva, which can be extended at great speed to seize prey

A Lestidae larva with out stretched labium



Habitat Diversity within the Study Area

- Roadside ditches*
- Ponds*
- Paddy fields*
- Forested streams*



Dragonfly Diversity in the World

- 5,680 species : 2,739 belong to the suborder Zygoptera (19 families) and 2,941 to the suborder Anisoptera (12 families)
- Estimated 1,000 to 1,500 species of dragonflies await description & if true, the actual number of extant species close to 7,000
- The Oriental (300-400), Australasian and especially the Neotropical regions hold the highest number of undescribed species
- Of eight ecoregions in the world Oriental has 21 families of 31 families.
- 235 of 642 genus in the world.
- 1665 species of 5860 described species in the world

Number of dragonfly families, genus & Species in Oriental Region

Family	Genus	Species
Epiophlebiidae	1	1
Euphaeidae	12	65
Gomphidae	43	358
Lestidae	5	39
Lestoideidae	1	4
Libellulidae	56	190
Macromiidae	2	50
Megapodagrionidae	10	28
Platycnemididae	8	130
Platystictidae	5	119
Protoneuridae	8	57
Pseudolestidae	3	15
Synlestidae	2	17

Continued

Family	Genus	Species
Aeshnidae	18	138
Amphipterygidae	1	5
Calopterygidae	10	60
Chlorocyphidae	14	80
Coenagrionidae	23	185
Cordulegastridae	5	27
Chlorogomphidae	1	40
Corduliidae	7	57
Total	235	1665

Dragonfly Diversity in Bhutan

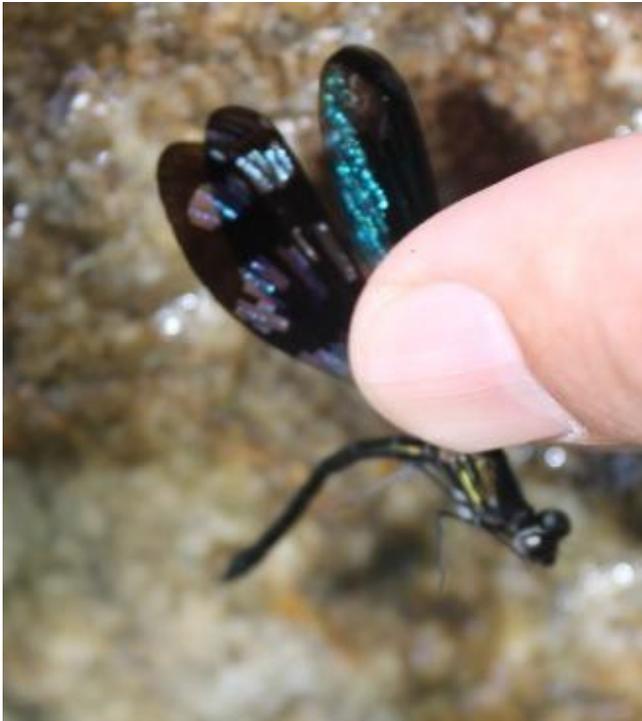
Family	Genus	Species
Coenagrionidae	8	11
Platycnemididae	3	6
Platystictidae	2	2
Lestidae	2	4
Synlestidae	1	1
Calopterygidae	3	3
Chlorocyphidae	1	3
Euphaeidae	4	5
Epiophlebiidae	1	1
Gomphidae	5	5
Aeshnidae	6	6
Cordulegastridae	3	3
Corduliidae	1	1
Libellulidae	13	24
Total: 14	53	75

Dragonfly diversity in Toebay Rongchhu Watershed

Family	Genus	Species
Coenagrionidae	1	2
Platycnemididae	1	2
Lestidae	1	1
Calopterygidae	2	2
Chlorocyphidae	1	1
Euphaeidae	1	1
Epiophlebiidae	1	1
Gomphidae	2?	2? Larva present
Aeshnidae	?	? Larva present
Cordulegastridae	?	? Larva present
Platystictidae	1?	1?
Libellulidae	6	8?

Photos of adult dragonflies in Toebay Rongchhu

Rhinocypha cuneata in
Jichulum



Anisopleura bella in Jichulum



Calicnemia eximia



Caliphaea confusa



Ceriagrion fallax cerinomelas



Pantala flavescens - the most common & migratory species



Neurobasis chinensis at Toebay
Rongchhu below Chimi Lakhang



Palpopleura s. sexmaculata
common in paddy fields



Acisoma p. panorpoides



Calicnemia mortoni



Some Photos of Larva

- Zygoptera: **Euphaeidae** larva from Jichulum.
- Below *Epiophlebia laidlawi*
- Aeshnidae larva from Drakarpo lumchhu
- Below Cordulegastridae in Jichulum



Threats to Habitat

- water abstraction for different uses,
- land conversion
- constructions of houses along stream sites
- road widening
- logging
- waste disposal along stream banks and into the streams
- grazing
- other anthropogenic activities like fern collection from riparian zones





Conservation issues:

- needs research in baseline data gathering for dragonfly diversity
- needs to recognize conservation of dragonfly and threats to it by stakeholders
- needs to educate the general public on importance of conserving dragonfly diversity
- needs consorted efforts from different sectors of government and other institutes like research institutes within the country

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THANK YOU AND HOPE SOME OF
YOU MAY CARRY FORWARD THE
WORK OF CONSERVING
DRAGONFLIES