

CHAPTER 3
TAXONOMIC KEY

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INTRODUCTION

Taxonomic keys are used for the taxonomic identification of organisms, in biological sciences. A key is formed as a series of couplets, each couplet having two opposing features of an organism. Users can select the feature that best fits the unidentified organism, and this leads to another couplet or to a specific taxon. All of the features that were not selected are instantly rejected. Since the key is formed of pairs of contrasting characteristics, it is denoted as a dichotomous key.

Sometimes, identification can be easily done using pictures in field guides. However, the reliability of identification is corroborated only with the help of a taxonomic key.

A good number of taxonomic keys are available in the literature for the identification of odonates. Most of them were constructed using complicated morphological features like wing venation. Only a person who has a thorough knowledge of odonate morphology including wing venation features can use these keys for identification.

During the present study, taxonomic keys were prepared for the 71 species recorded from both suborders. Keys were prepared using simple morphological features, which are easily perceivable for an interested layman. However, since Libellulidae is one of the most diverse families, simple venation characteristics had to be used for the preparation of the key to genera of this family and it is the modified version of the existing key (Fraser, 1936).

Key to suborders of Odonata

1. Fore and hind wings are similar in shape and width and are petiolated. Abdomen is very slender. During rest wings are kept closed over the body parallel to it. Suborder **Zygoptera** (Damselflies)

Fore and hind wings vary in shape and venations. Wings are not petiolated. Robust bodied. During rest wings are kept open and perpendicular to the body. Suborder **Anisoptera** (Dragonflies)

Key to the families of suborder Zygoptera

1. Wings are kept nearly wide open at rest Family **Lestidae**
Wings are closed during rest (2)
2. Abdomen shorter than hind wing
Bulbous eyes and protruding face..... Family **Chlorocyphidae**

- Abdomen twice or more than twice the length of hind wing
 Wings with slightly pointed tips Family **Platystictidae**
 Abdomen longer than hind wing but never have twice the length of hind wing
 (3)
3. Iridescently coloured body or wings (4)
 Non iridescently coloured body and wings (5)
4. Body iridescent green in colour
 Wings are iridescently green or blue or transparent with amber tint; often
 tipped with black
 Family **Calopterygidae**
 Iridescently coloured body with red, black or blackish brown colours
 Wings are transparent, brownish tinted or with black tips
 Family **Euphaeidae**
5. Variously coloured non metallic damselflies. Short discoidal cell, the anterior
 side much shorter than the basal, the distal end very acute
 Family **Coenagrionidae**
 Body black coloured, with blue, red, yellow markings. Discoidal cell
 elongated, the costal or anterior side slightly shorter than the basal, the distal
 end subacute Family **Platycnemididae**

Key to the species of genus *Lestes*

1. Thorax with metallic green antehumeral stripes having scalloped outer
 borders. Pale blue coloured abdomen is marked dorsally with black. Segment
 9 marked with a lateral blue spot and segment 10 with a small ventro lateral
 spot ***Lestes praemorsus***
 Thorax with metallic green ‘J’ shaped antehumeral stripes with expanding
 outer borders. Abdomen is pale brown laterally with broad dorsal metallic
 green stripe. Segment 9 is dirty white at the apical half and segment 10 is
 entirely dirty white ***Lestes elatus***

Key to the genera of Family Calopterygidae

1. Forewings are transparent. Hind wings in male are metallic coloured and
 opaque. In males, pterostigma is absent. In females false pterostigma is
 present or absent..... Genus ***Neurobasis***
 Wings are transparent with or without blackish brown patch at wing tips.
 Pterostigma is absent Genus ***Vestalis***

Key to the species of Genus *Vestalis*

1. Transparent wings with broad blackish brown patch on tips..... *Vestalis apicalis*
Transparent wings without any markings *Vestalis gracilis*

Key to the genera of family Chlorocyphidae

1. Wings are transparent at the basal half. Apical half is opaque, coloured and with bright coppery and violaceous reflex Genus *Heliocypha*
Transparent wings with amber tinted bases. Apices of forewings have black patch..... Genus *Libellago*

Key to the genera of family Platycnemididae

1. Anal appendages are homogenous and black in colour; Cylindrical abdomen is broader at the anal and basal ends.....
(2)
Superior anal appendages are shorter than inferiors, white or bluish white in colour; Abdomen cylindrical and of about even thickness throughout Genus *Copera*
2. Pterostigma nearly half as long again as broad; body metallic black or bronzed purple marked with citron yellow Genus *Onychargia*
Pterostigma small 1 ½ times as long as broad, diamond shaped; Black coloured body with red, yellow or blue markings..... Genus *Prodasineura*

Key to the species of genus *Copera*

1. Inferior anal appendages are 4 times elongated than superiors *Copera marginipes*
Inferior anal appendages have double the length of superiors *Copera vittata*

Key to the genera of the family Coenagrionidae

1. Post ocular triangular coloured areas or spots present (2)
Post ocular triangular coloured areas or spots absent. Body yellow, orange or olivaceous coloured, rarely marked with black Genus *Ceriagrion*

2. Smallest damselflies with abdomen not more than 18mm in length Genus *Agriocnemis*
 Damselflies with abdomen more than 20 mm in length
 (3)
3. Pterostigma dissimilar in fore and hind wings.....
 (4)
 Pterostigma similar in fore and hind wings
 (5)
4. Blue or violaceous coloured damselflies marked with black Genus *Aciagrion*
 Blue, green and yellow coloured damselflies marked more or less with black Genus *Ischnura*
5. Pterostigma diamond shaped (6)
 Pterostigma subquadrate shaped Genus *Archibasis*
6. Black marked with blue or blue marked with black coloured damselflies with abdomen having the length of around 22 mm Genus *Paracercion*
 Bright blue coloured damselflies marked with black or orange, green etc. with abdomen having the length of around 30 mm Genus *Pseudagrion*

Key to the species of genus *Aciagrion*

1. Blue and black coloured damselfly; segment 8 with a narrow dorsal triangle of black *Aciagrion occidentale*
 Violaceous blue coloured damselfly marked with black; segment 8 with a short narrow black stripe on each side *Aciagrion approximans krishna*

Key to the species of genus *Agriocnemis*

1. Damselfly having a cobra hood marking on the dorsal side of segment 2 *Agriocnemis keralensis*
 Damselfly without a cobra hood marking on the dorsal side of segment 2 (2)

2. Labrum metallic blue *Agriocnemis pygmaea*
 Labrum nonmetallic (3)
3. Superior anal appendages are black, narrow, elongated and slightly curved downward; bluish coloured body with extensive black markings *Agriocnemis splendidissima*
 Superior anal appendages are pale blue or pinkish, broadly triangular and obtusely pointed; body bluish white marked with black *Agriocnemis pieris*

Key to the species of genus *Ceriagrion*

1. Abdomen single coloured (2)
 Abdomen multicoloured; Abdomen bright red at base and anal ends , black on dorsum in between *Ceriagrion cerinorubellum*
2. Abdomen bright citron yellow, without markings *Ceriagrion coromandelianum*
 Abdomen bright reddish orange, without markings *Ceriagrion rubiae*

Key to the species of genus *Ischnura*

1. Abdominal segments 3-6 citron yellow; abdomen having the length of less than 20mm..... *Ischnura rubilio*
 Abdominal segments 3-6 black on dorsum; abdomen having the length of more than 20 mm *Ischnura senegalensis*

Key to the species of genus *Paracercion*

1. Yellowish green eyes are brownish above. Thorax is dorsally black without any stripes and covered with greyish pruinescence *Paracercion calamorum*

2. Bluish eyes. Thorax dorsally black with broad blue stripes and without any pruinescence *Paracercion malayanum*

Key to the species of genus *Pseudagrion*

1. Medium sized blue damselfly with black markings on body. Orange shade is present at the front portion of head..... *Pseudagrion rubriceps*
 Medium sized blue damselfly with black markings on body, without orange shade at the front portion of head..... (2)
2. Thorax with a broad black median line..... (3)
 Bluish green thorax with three fine black median lines *Pseudagrion decorum*
3. Black median line of thorax is accompanied with lateral broad blue stripes..... (4)
 Black median line of thorax with broad greenish yellow stripes on adjacent sides..... *Pseudagrion indicum*
4. Black band on 8th abdominal segment is broad.....*Pseudagrion microcephalum*
 Black band on 8th abdominal segment is narrow (thread like) (5)
5. Superior anal appendages are about half the length of segment 10 *Pseudagrion australasiae*
 Superior anal appendages are slightly shorter than segment 10 *Pseudagrion malabaricum*

Key to the families of suborder Anisoptera

1. Eyes widely separated. Abdomen bulbous at the end Family **Gomphidae**
 Eyes broadly touch each other on face. Abdomen not bulbous at the end (2)
2. Dragonflies with large size and non iridescent body color; abdomen tumid at the base Family **Aeshnidae**
 Dragonflies with bright body colour; found in small, medium and large body sizes; Abdomen with a variety of shapes Family **Libellulidae**

Key to the genera of family Aeshnidae

1. Dragonflies having homogenous body colouration of dull brown or green. Long and narrow anal appendages, long hairs are present at the inner side of apical half. Inferiors are triangular shaped Genus *Gynacantha*
Dragonflies having variably coloured body with yellow, blue and black. Superior anal appendages are lanceolate with bluntly rounded apices having a small spine. Inferiors are quadrate shaped Genus *Anax*

Key to the species of genus *Anax*

1. Thorax is unmarked and pale greenish. Abdominal segments 1 and 2 are pale greenish, segment 2 is turquoise blue on dorsum and segment 3 has a pair of triangle-shaped turquoise blue markings dorsally *Anax guttatus*
Bluish green thorax with broad black lateral stripes. Abdomen with a ground colour of pale reddish brown and black markings *Anax immaculifrons*

Key to the species of genus *Gynacantha*

1. Thorax and abdomen is brown in colour with dark brown markings. Segment 3 is constricted..... *Gynacantha dravida*
Thorax and segments 1-3 of abdomen are grass green in colour. Segment 3 is not constricted *Gynacantha millardi*

Key to the genera of family Libellulidae

1. Discoidal cell base of hind wing is broadly distal to level of arc; forewing discoidal cell is markedly angulated at the coastal side, anal loop is absent or present in small size having up to 6 cells; discoidal field is started by 1 row of cells Genus *Tetrathemis*
Hind wing discoidal cell base at level of arc; forewing discoidal cell is not angulated at the costal side; elongated anal loop with more than 6 cells; 2 or more rows of cells present at the beginning of discoidal field (2)

2. Hooks are absent in claws. Metallic coloured thorax Genus *Onychothemis*
 Length of claw hooks same as that of claws, bifid in appearance. Metallic coloured thorax Genus *Zygonyx*
 Claw hooks are shorter in length than that of claws and originating from about middle of latter. Thorax is metallic rarely..... (3)
3. Anal loop borders are meeting at the posterior of wing (open) (4)
 Anal loop borders converging and meeting before posterior wing border, anal loop with closed apex (5)
4. Abdomen with wider base, and gradually narrowing to the end; hind wing has white patch at the centre..... Genus *Tholymis*
 Abdomen is dilated at the base, then abruptly tapered and narrow and cylindrical to the end; wing tips are dark brownish and white patch is absent in wings Genus *Zyxomma*
5. Forewings with complete distal antenodal nervures..... (6)
 Forewings with incomplete distal antenodal nervures..... (7)
6. Prothorax with large lobe and long hairs..... (8)
 Prothorax with small lobe, inconspicuous and without hairs (9)
7. Prothorax with large lobe and long hairs (11)
 Prothorax with small lobe, inconspicuous and without hairs (12)
8. Frons metallic coloured above..... Genus *Brachydiplax*
 Frons non metallic above (10)
9. Subtrigone is single celled in forewing Genus *Aethriamanta*
 Subtrigone is 3-celled in fore wing Genus *Urothemis*

10. Forewing with 6 antenodal nervure; abdomen is dilated at segments 1 to 6, narrow and cylindrical at segments 7 to 10 Genus *Acisoma*
 Forewing with 12 or more antenodal nervures; variable shaped abdomen; but never resembling the last Genus *Orthetrum*
11. Cuii in hindwing is widely separated from posterior angle of discoidal cell; eyes meeting at a single point; row of 3 cells at the beginning of discoidal field and then continued as rows of 2 cells Genus *Rhodothemis*
 Cuii in hind wing, arising from posterior angle of discoidal cell; eyes are broadly or narrowly contiguous; discoidal field variable (13)
12. Sectors of arc in fore wing separated and diverging at origin; Dark metallic coloured body; Wings are broadly opaque with bluish black or black and golden amber Genus *Rhyothemis*
 Sectors of arc in fore wing arising from a common and rather long stalk (14)
13. Eyes contiguous narrowly; discoidal cell in hind wing entire; forewing with straight coastal border; frons non metallic above; discoidal field in fore wing beginning with a row of 2 cells Genus *Diplacodes*
 Eyes are broadly contiguous; hind wing discoidal cell is traversed; costal border of fore-wing sinuous near base; frons metallic above; discoidal field beginning with at least 3 rows of cells Genus *Palpopleura*
14. Discoidal field with borders converging strongly at wing margin (15)
 Discoidal field with borders parallel or widely divergent at wing margin (16)
15. Forewing discoidal cell is narrow, its coastal side only about one fourth to one third the length of basal; in between Rii and Riii, a prominent

supplementary nervure (IRii) is present.....

Genus *Pantala*

Wider discoidal cell is present in fore wing, its costal side about one half the length of basal; in between Rii and Riii, no supplementary nervure(IRii) is present Genus *Trithemis*

16. Elongated genital hamules; projecting and prominent in profile; broad based hind wing is tapered at apex; straight rows of closely packed narrow cells are present at base of hind wing; short pterostigma with unequal size in fore and hind wings
(17)

Small genital hamules are inconspicuous in profile; hind wing not markedly broad at base and apex not markedly tapered; no closely packed straight rows of cells are present at base of hind wing; pterostigma variable but equal sized in fore and hind wing..... (18)

17. Riii markedly wavy; equal sized pterostigma; distal and apical angles of anal loop equal Genus *Hydrobasileus*
Riii evenly curved, not wavy; smaller pterostigma in hind wing than in forewing; apical angle of anal loop much more acute than distal Genus *Tramea*

18. Bicolourous pterostigma, black at centre and white on ends; 2 rows of cells are present between IRiii and Rspl Genus *Bradinopyga*

Unicolourous pterostigma; 1 or rarely 2 rows of cells are present between IRiii and Rspl (19)

19. Wings are coloured and opaque at the basal half or more broadly..... Genus *Neurothemis*

Transparent wings usually uncoloured or having a yellow patch at the hind wing base..... (20)

20. Body red or ochreous in colour with ochreous or orange patch at the base or centre (21)

- Body colour is variable and darker, never with a reddish or ochreous tint
 (22)
21. Wings with ochreous patch at the base; eyes are narrowly contiguous; face
 and frons red..... Genus
Crocothemis
- Wings with orange patch at the centre; face and abdomen never red; eyes are
 widely contiguous Genus *Brachythemis*
22. Arc is present between the second and third antenodal nervures; 1 row of
 cells between IRiii and Rspl Genus
Lathrecista
- Arc is present between the first and second antenodal nervures; 2 rows of
 cells between IRiii and Rspl Genus
Potamarcha

Key to the species of genus *Brachydiplax*

1. Wings are transparent tinted with brown at the base
 *Brachydiplax chalybea*
- Wings are transparent without any colouration
 *Brachydiplax sobrina*

Key to the species of genus *Diplacodes*

1. Wings with blackish brown tips *Diplacodes
 nebulosa*
- Transparent wings *Diplacodes trivialis*

Key to the species of genus *Neurothemis*

1. Eyes, thorax and abdomen reddish brown; Wings are reddish brown except
 at the apical end *Neurothemis
 fulvia*
2. Thorax and abdomen black coloured with yellow mid dorsal carina; Basal
 half of wings are black with milky white border *Neurothemis
 tullia*

Key to the species of genus *Orthetrum*

1. Abdomen reddish coloured (2)
Abdomen not reddish in colour (3)
2. Thorax is dark brown with purple pruinescence; Abdomen vermilion red in colour *Orthetrum pruinatum*
Thorax is reddish brown. Abdomen blood red coloured *Orthetrum chrysis*
3. Abdomen is slim, with enormously swollen base and laterally compressed end; body greenish yellow with black markings *Orthetrum sabina*
Abdomen with dorso-ventrally dilated base; pruinose pale blue in colour (4)
4. Transparent wings are tinted with dark amber yellow at the base; last two segments of abdomen are black *Orthetrum glaucum*
Transparent wings; Abdomen with pale blue pruinescence upto the last segment *Orthetrum luzonicum*

Key to the species of genus *Trithemis*

1. Elongated legs; bicolourous pterostigma; yellow coloured body with black markings *Trithemis pallidinervis*
Legs with ordinary length; unicolourous pterostigma; variable body colour (2)
2. Body black coloured with purple pruinescence; a small dark brown spot at the extreme base of hind wing; venation is black *Trithemis festiva*
Body violaceous red in colour; a reddish brown spot at the base of hind wing; venation is red
Trithemis aurora

PLATE 12 – WING VENATION OF DRAGONFLY

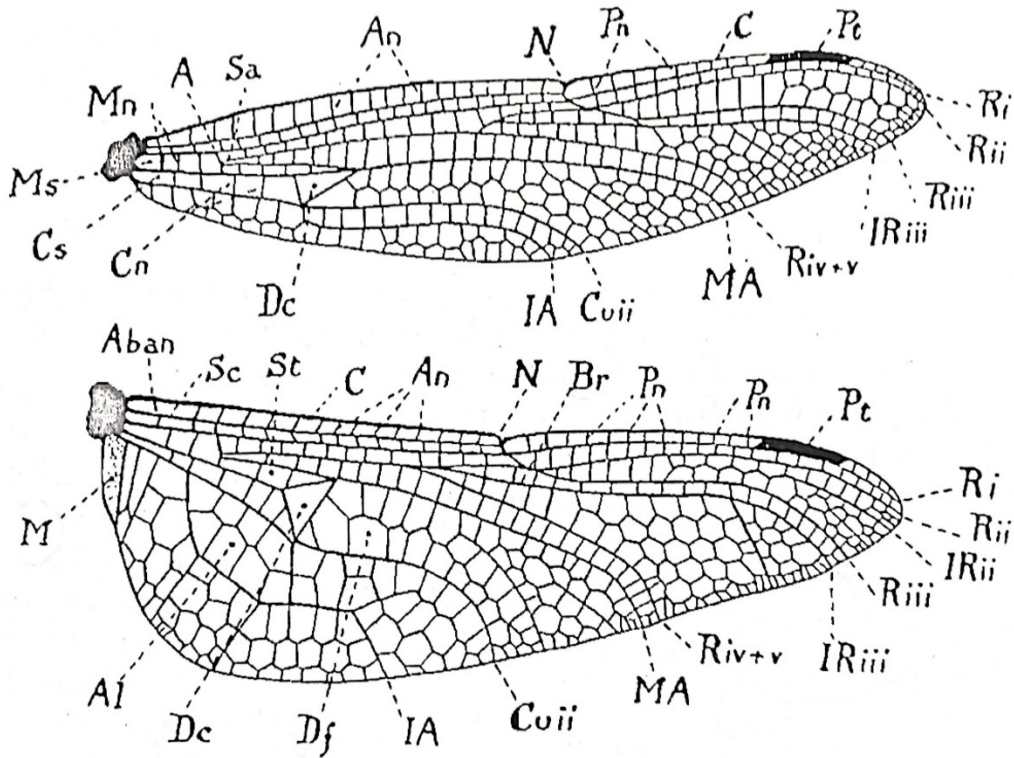


Figure 13 A: Fore and Hind wings of a dragonfly © Fraser (1933). C- Costa; Sc- Subcosta; Ri- Radius; Rii, IRii, Riii, Riv+v -Branches and intercalated branches of radius; MA- Anterior median; Cui- First cubitus; Cuii- Second cubitus; IA- First anal; Cuii+IA- Cubito-anal; A' -Second anal