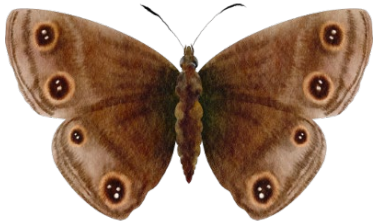
The Land Between
Cottage Country's Conservation Organization



The Land Between
Dichotomous Key for Moth Monitors

Key 4: Identifying Lepidoptera to Family:

1. Row of bristles along margin of hind wing or humeral angle of hindwing more or less expanded; Rs in hindwing unbranched……..2

2. Wingspan 1 inch or greater; forewing more or less triangular, hindwing rounded; hairs on anal margin of hindwing short……..3

3. Antennae threadlike or plumose; anal vein nearly always lacking in forewing and hindwing; short tibial spurs; wingspan >20mm……..4

4. Distinct in appearance and venation; body heavy; small wings; antennae thickened, somewhat spindle-shaped……..SPHINGIDAE

4. Typical moth appearance……..5

5. Cu in forewing appears 3-branched……..6

6. Moth large, much greater than 1 inch……..7

7. Humeral angle of hindwing not noticeably expanded……..8a

8a. Hindwing with only 1 anal vein; discal cell in forewing open; antennae plumose……SATURNIIDAE

7. Humeral angle of hindwing considerably expanded……..8b

8b. Hindwing with 2 anal veins; discal cells closed; antennae plumose only in basal half……..CITHERONIIDAE

6. Moth not much greater than 1 inch……..9

9. Sc and R in hindwing fused for a short distance beyond basal areole then separating……..10

10. Large basal areole; antennae slender/threadlike (never plumose); dark colored; wingspan 20-40mm……LIPARIDAE

10. Small basal areole……11

11. Wingspan 20-40mm; antennae slender/threadlike (never plumose); ocelli present; dark colored……..NOCTUIDAE

11. Wingspan about 1”; antennae swollen apically; 2 white/yellow spots on each wing; dark colored……AGARISTIDAE

9. Sc and R in hindwing not fused……..12

12. Sc in hindwing with a rather abrupt angle basally; slender bodied; small-medium sized……..GEOMETRIDAE

12. Sc, R1 and Rs run parallel along discal cell in hindwing, Rs and M1 stalked beyond discal cell……...NOTODONTIDAE

5. Cu in forewing appears 4-branched……13

13. Body hairy; hindwing without frenulum; antennae somewhat plumose; humoral angle expanded, with veins….LASIOCAMPIDAE

13. Body not hairy……..14

14. Apex of forewing sickle-shaped; wingspan 1” or less; brownish; slender, small bodied; frenulum small/absent….DREPANIDAE

14. Apex of forewing not sickle-shaped……15

15. Sc and R1 in hindwing absent……..CTENUCHIDAE

15. Sc and R1 present in hindwing……16

16. Sc + R in hindwing fused to middle of discal cell or for a short distance beyond basal areole; Sc swollen at base……..17

17. Ocelli present; light-colored; brightly spotted or banded; small-medium size……ARCTIIDAE

17. Ocelli absent; forewing with tufts of raised scales; wingspan 1” or less……NOLIDAE

16. Sc and R in hindwing fused for a short distance beyond basal areole then separating……..18

18. Large basal areole; antennae slender/threadlike (never plumose); dark colored; wingspan 20-40mm……..LIPARIDAE

18. Small basal areole……..19

19. Wingspan 20-40mm; antennae slender/threadlike (never plumose); ocelli present; dark colored……..NOCTUIDAE

19. Wingspan about 1”; antennae swollen apically; 2 white/yellow spots on each wing; dark colored……AGARISTIDAE

3. Antennae not threadlike or plumose……...20

20. Antennae knobbed (never hooked) and close together at base; some branches of R in forewing stalked beyond discal cell……..21

21. Hindwing with long, tail-like prolongation; R 5-branched and Cu appearing 4-branched in forewing……..PAPILIONIDAE

21. Hindwing without long, tail-like prolongation……...22

22. Front legs normal……..23

23. 2 small reddish eye spots on the hindwing; gray or white with dark markings; wingspan about 2 inches…….PARNASSIIDAE

23. Hindwing without 2 small reddish eye spots……...24

24. M1 of forewing stalked; tarsal claws forked; white, yellow or orange with black markings; small-medium……...PIERIDAE

24. M1 of forewing not stalked; tarsal claws not forked; brightly colored; small sized……LYCAENIDAE

22. Front legs reduced or greatly reduced……..25

25. Eye spots on wings; veins greatly swollen at base; grayish or brownish; small-medium……..SATYRIDAE

25. No eye spots on wings; veins not greatly swollen at base……...26

26. Hindwing without a humeral vein; brightly colored; small size……..LYCAENIDAE

26. Hindwing with a straight (or bent toward wing tip) humeral vein and 2 anal veins……..27

27. Forewing has 3A vein; discal cell in hindwing closed by a well-developed vein; black markings; large size…….DANAIDAE

27. Forewing lacking 3A vein; discal cell in hindwing open or closed by a weak vein……..NYMPHALIDAE

20. Antennae clubbed and usually hooked, widely separated at base; R in forewing 5-branched all coming off discal cell……..28

28. Head as wide or wider than thorax; hind tibiae usually with 2 pairs of spurs; wingspan less than 30mm……HESPERIIDAE

2. Wingspan not 1” or greater; wing shape variable; long tibial spurs; fringe of long hairs on anal margin of hindwing……..29

29. Wing shape distinctive or with distinctive scaling……..30

30. Body wasp-like; forewings long/narrow; spines on costal margin of hindwing and posterior margin of forewing……..SESSIIDAE

30. Body not wasp-like……31

31. Forewing with 2-4 plumelike lobes, hindwing with 3; long-legged; slender; small bodied……..PTEROPHORIDAE

31. Hindwing somewhat trapezoidal with concave margin behind apex; head smooth-scaled; small-minute……GELECHIIDAE

29. Wing shape not distinctive or without distinctive scaling……..32

32. Wings broad and more or less rounded apically; forewing somewhat triangular; hindwing as broad or broader than forewing……..33

33. Heavy-bodied, stout……34

34. Body very hairy; brownish or cream-colored; wingspan 25-35mm……MEGALOPYGIDAE

34. Body not very hairy……...35

35. Wings spotted or mottled; abdomen extends beyond hindwing; 2 complete anal veins in forewing……COSSIDAE

35. Wings not spotted or mottled; abdomen does not extend beyond hindwing……36

36. Wings broad and round; body brownish, marked; forewing with 2 complete anal veins……..LIMACODIDAE

36. Wings thinly scaled or almost devoid of scales; hindwing about as wide as long, with 2 anal veins……PSYCHIDAE

33. Body not heavy or stout……37

37. Light translucent spots in wings; forewing somewhat triangular; hindwing scalloped or rounded……THYRIDIDAE

37. Wings lacking light translucent spots……38

38. Ocelli large and conspicuous; forewing square-tipped; head smooth-scaled……..GLYPHIPTERYGIDAE

38. Ocelli not large and conspicuous……..39

39. Forewing brightly patterned; head smooth-scaled……YPONOMEUTIDAE

39. Forewing not brightly patterned……..40

40. Eyes hairy; no stalked wing veins; wingspan 12mm or more……ACROLOPHIDAE

40. Eyes not hairy……..41

41. Wings thinly scaled; hindwing with 2 or 3 anal veins, Sc and R fused to near end of discal cell……..PYROMORPHIDAE

41. Wings not thinly scaled……..42

42. Forewing square-tipped or with flat edge……..43

43. Cu2 in forewing rises at end of discal cell; Rs and M1 in hindwing stalked; head smooth-scaled…..STENOMIDAE

43. Cu2 in forewing rises in basal ¾ of discal cell……44

44. Forewing with R4 and R5 separate; upper side of Cu in hindwing with fringe of long hairs….OLETHREUTIDAE

44. Forewing with R4 and R5 stalked or fused. M2, M3 and Cu1 parallel or divergent……TORTRICIDAE

42. Forewing round-tipped……..45

45. Body somewhat flattened……..46

46. Forewing marked with black and white; M2 in hindwing rises closer to M1 than to M3……..ETHMIIDAE

46. Cu2 in forewing rises in distal ¼ of discal cell; R4 + R5 in forewing stalked; brownish……..OECOPHORIDAE

45. Body not flattened……47

47. Hindwing about as wide as forewing……48

48. Wing surface with minute spines under the scales; venation usually complete……INCURVARIIDAE

48. Head rough-scaled or bristly……..TINEIDAE

47. Hindwing wider than forewing……..49

49. Head rough-scaled or bristly……..TINEIDAE

49. Head not rough-scaled or bristly……..50

50. SC+R1 and Rs in hindwing fused or close together after discal cell, then separating……PYRALIDAE

50. 1A absent in forewing, R5 not stalked with R4; M1 in hindwing usually stalked with Rs….PHALONIIDAE

32. Wings narrow and pointed apically; hindwing usually narrower than forewing; long fringe on anal margin of hindwing……..51

51. Antennae with enlarged basal segment that covers the compound eye……..52

52. Forewing with branched veins……..53

53. Venation greatly reduced; only 3 or 4 unbranched veins……OPOSTEGIDAE

53. Venation normal, not reduced……..NEPTICULIDAE

52. Forewing without branched veins……54

54. Hindwing without a discal cell; vertex scaling rough or smooth……GRACILARIIDAE

54. Ocelli absent; vertex scaling rough and bristly……LYONEDTIIDAE

51. Antennae without enlarged basal segment that covers the compound eye……55

55. Discal cell absent in hindwing……..56

56. Ocelli very large; R vein in hindwing near middle of wing with a branch to costal margin……DOUGLASIIDAE

56. Ocelli not very large……..57

57. Head smooth-scaled……..HELIOZELIDAE

57. Antennae with or without enlarged basal segment covering eye; scaling on vertex rough or smooth…….GRACILARIIDAE

55. Discal cell present in hindwing……..58

58. Forewing discal cell oblique, its apex closer to hind margin than to costal margin; front tibiae slender……COLEOPHORIDAE

58. Forewing discal cell not oblique……..59

59. R4 and R5 in forewing stalked……..60

60. R4 and R5 in forewing long-stalked; forewing with a stigma-like thickening between C and R1……BLASTOBASIDAE

60. R4 and R5 in forewing stalked, R1 usually rises about middle of discal cell or slightly beyond…….COSMOPTERYGIDAE

59. R4 and R5 in forewing not stalked……..61

61. Forewing brightly patterned; hindwing about as wide as forewing; wings narrowly rounded at apex……PLUTELLIDAE

61. Forewing not brightly patterned……62

62. Forewing with 5 veins extending from discal cell to wing margin;vertex with rough bristly hair……..TISCHERIIDAE

62. Forewing with 8 or more veins extending from discal cell to wing margin……63

63. R1 rises about middle of discal cell in forewing……64

64. Hindwing with a forked vein at apex; dark brown or gray with silvery spots or bands……..ELACHISTIDAE

64. Hindwing without a forked vein at apex; 3 or more veins rise from discal cell in forewing…….HELIODINIDAE

63. R1 rises before or after middle of discal cell in forewing……..65

65. R1 in forewing rises before middle of discal cell; Rs in hindwing ends at/before apex of wing…...EPERMENIIDAE

65. R1 in forewing rises about 2/3 the length of discal cell; forked vein at tip of hindwing……..SCYTHRIDAE

1. Veins in forewing and hindwing similar; RS in hindwing with as many branches as in forewing; frenulum absent……66

66. Wingspan 1-3 inches; no tibial spurs……..HEPIALIDAE

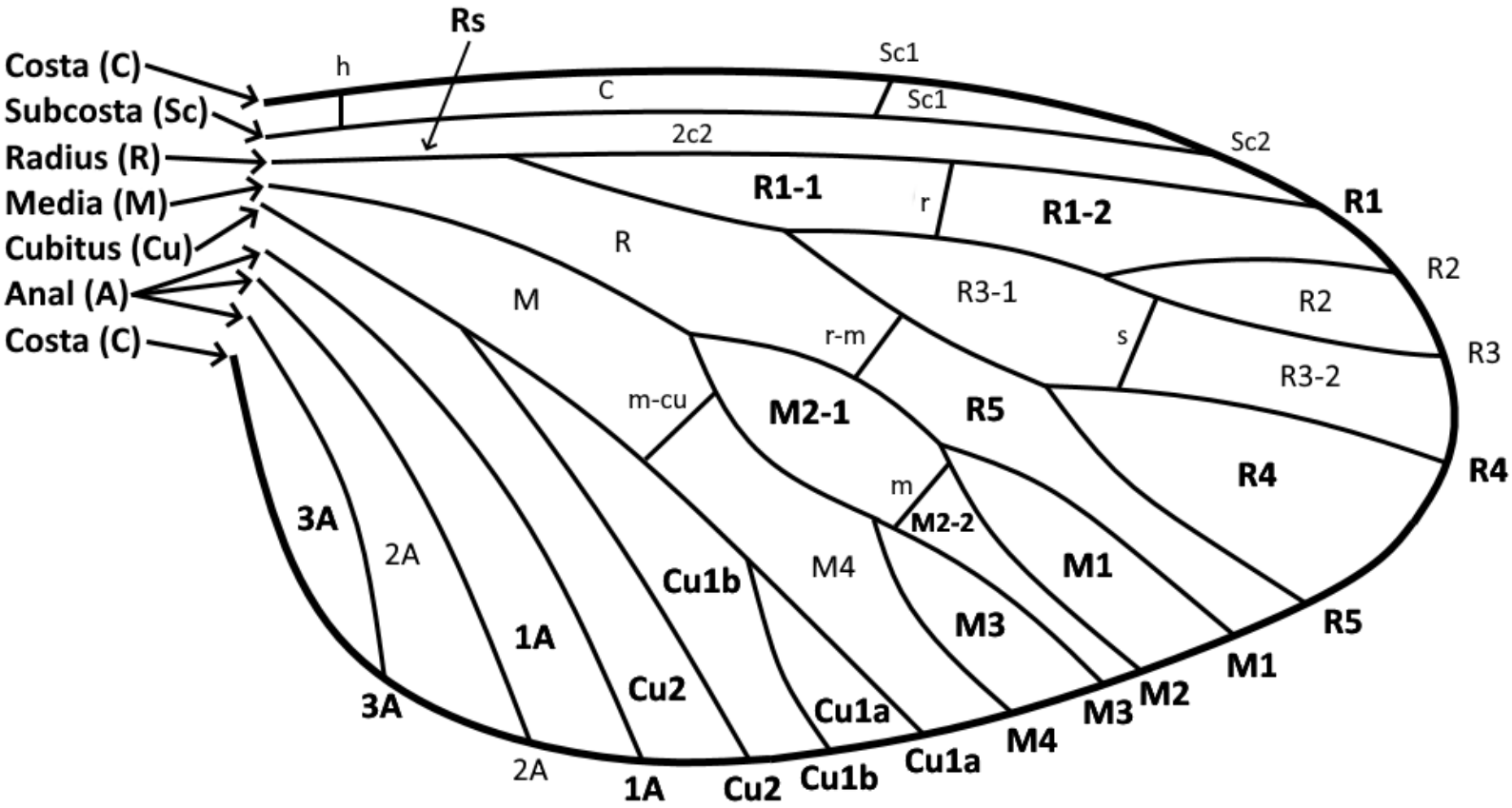
66. Wingspread 12mm or less……..67

67. Middle tibiae with 1 spur; mandibles vestigial; Sc in forewing forked near its tip……..ERIOCRANIIDAE

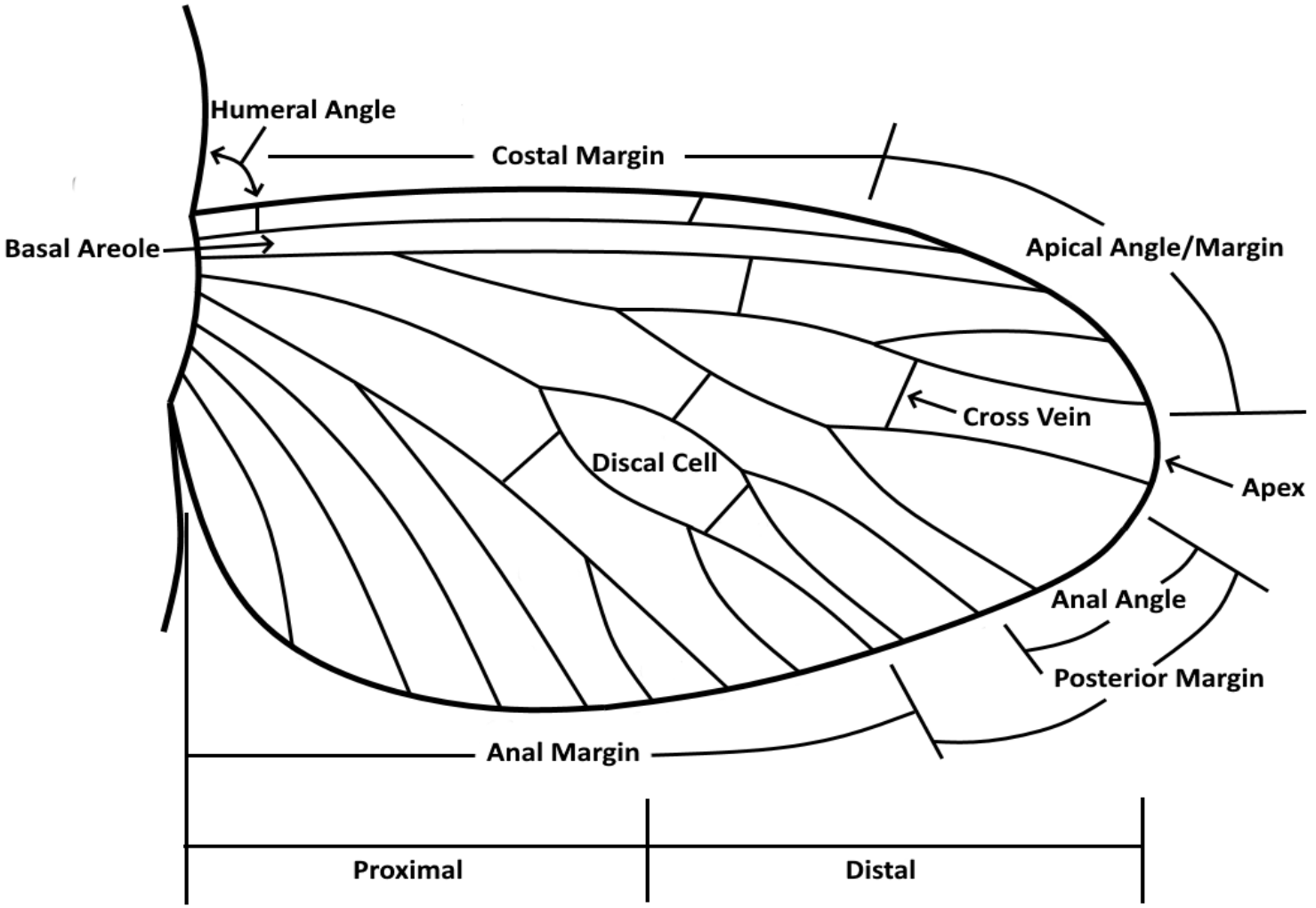
67. Middle tibiae without spurs; mandibles functioning; Sc in forewing forked near its middle…….MICROPTERYGIDAE

Appendices:

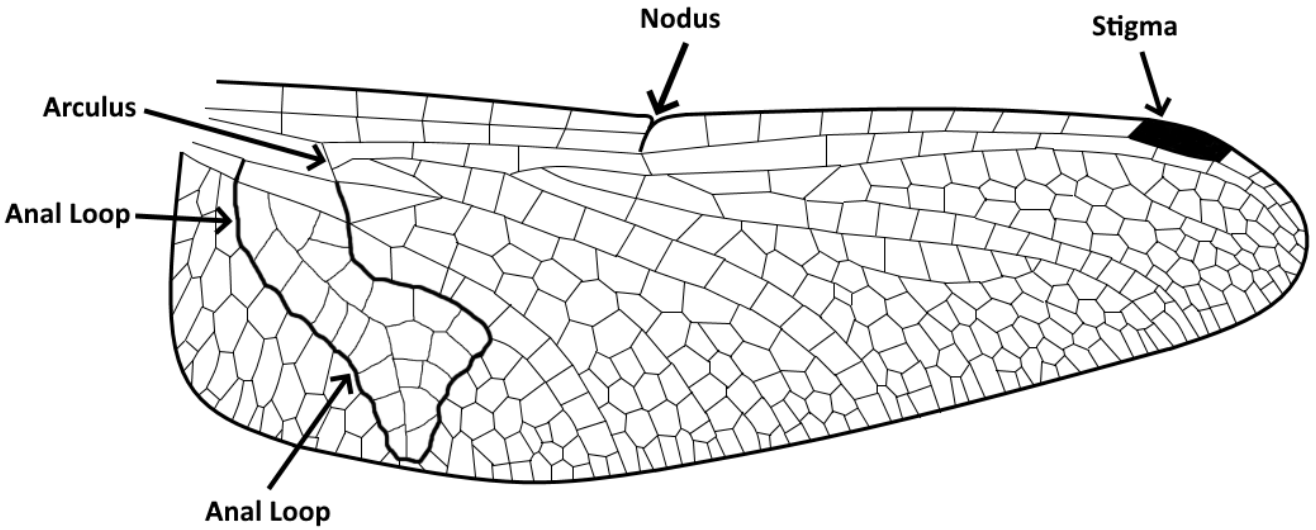
Appendix 1: Wing Diagram with Vein Names



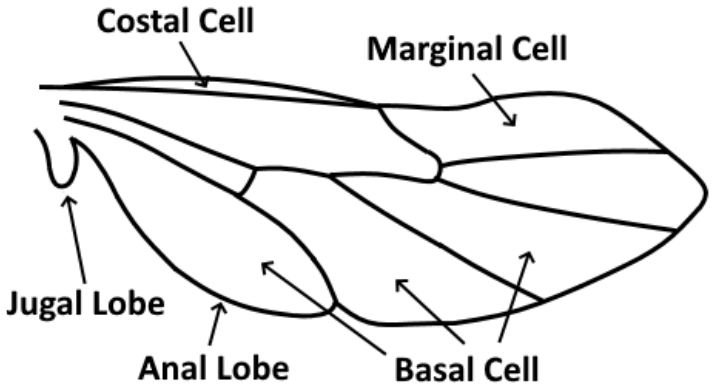
Appendix 2: Wing Diagram with Common Wing Parts



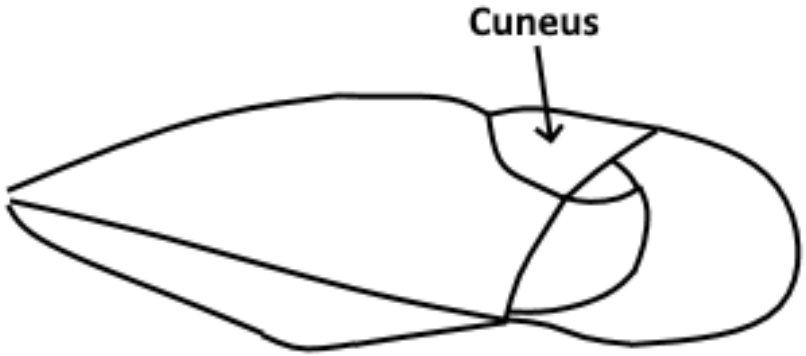
Appendix 3: Odonata Wing with Parts



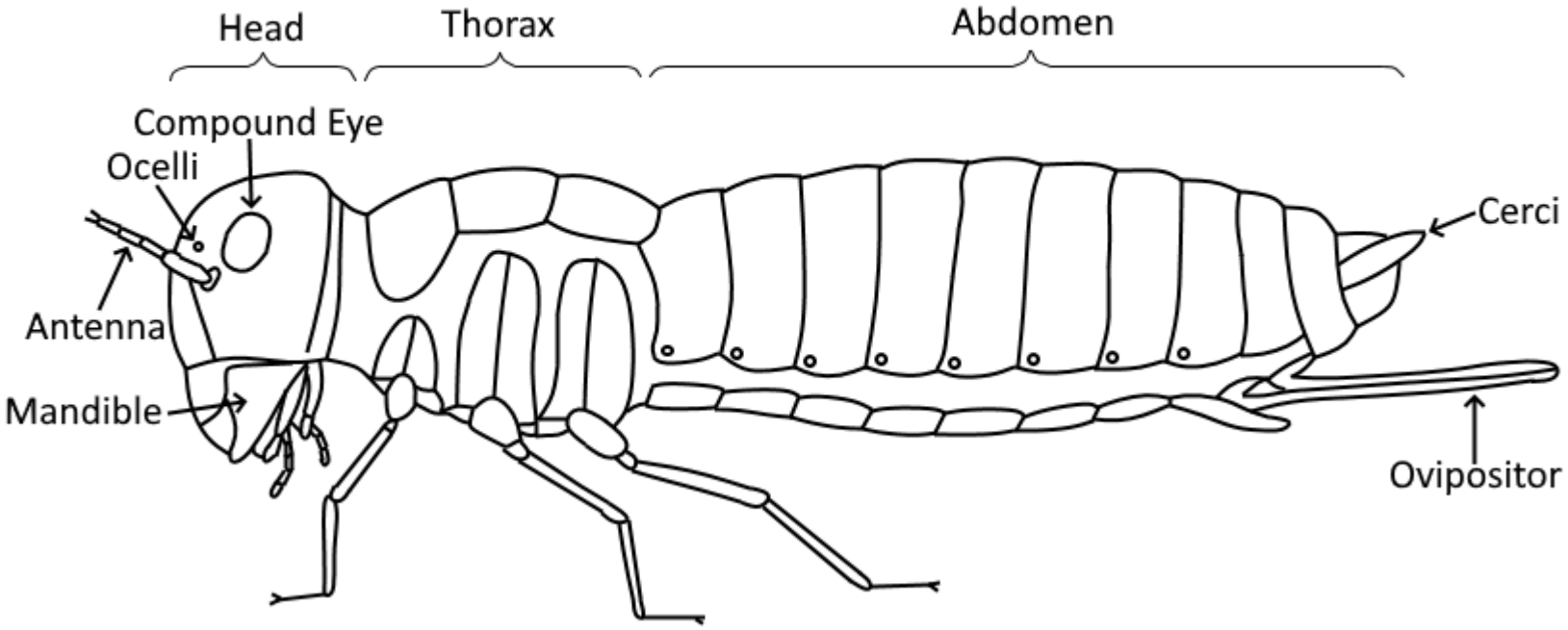
Appendix 4: Hymenoptera Wing with Parts



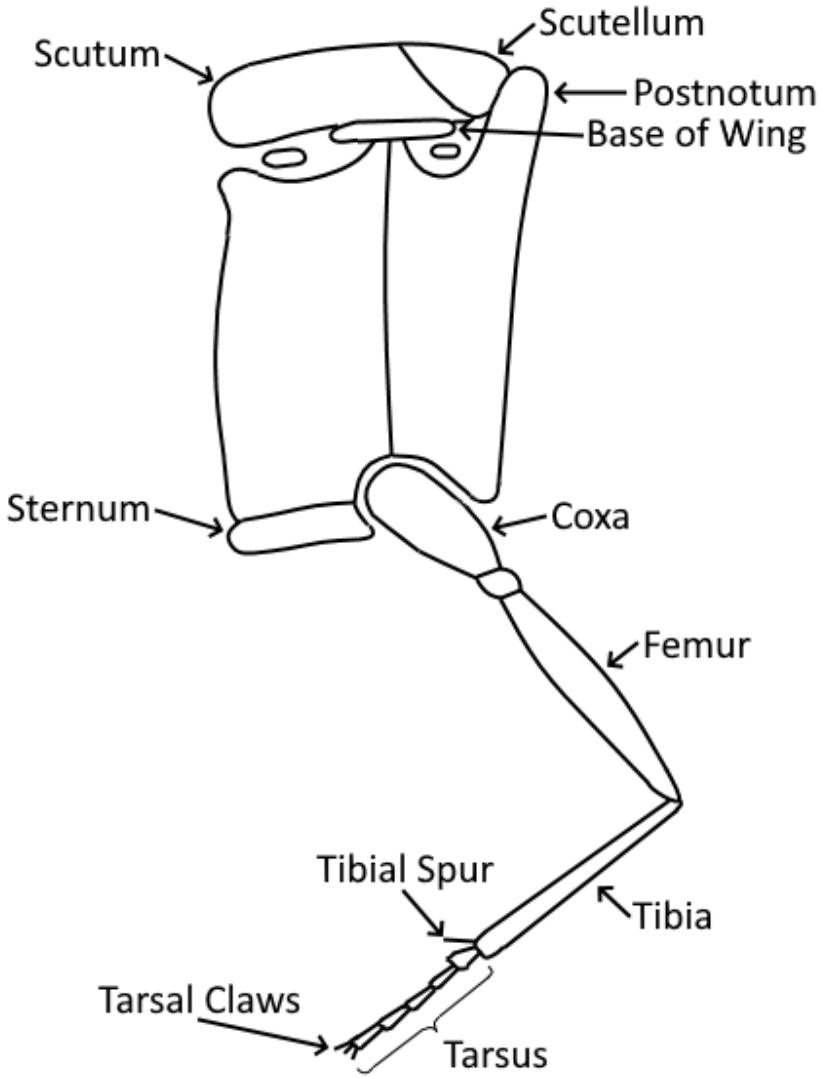
Appendix 5: Cuneus Diagram



Appendix 6: Standard Insect with Parts Labelled



Appendix 7: Thorax and Leg Segment with Parts



Glossary:

Abdomen: The last of the 3 body segments, closest to the rear (See Appendix 6).
Anal Angle: The angle of the wing below the apex to the anal margin (See Appendix 2).
Antenna(e): Appendages on the head, often above mouth parts (See Appendix 6).
Anterior: At the front; in front of.
Apex: The distal tip of the wing (See Appendix 2).
Apical: At the end or the furthest edge (See Appendix 2).
Apical Spur: Spur located on the apical edge.
Arculus: A basal cross vein between R and Cu (Odonata, See Appendix 3).
Areole: See Basal Areole.
Basal: At the base; point of attachment.
Basal Areole: The cell at the base of the hind wing between Sc and R (Lepidoptera, See Appendix 2).
Beak: The proboscis, or protruding mouth part structures of a sucking insect.
Cerci: A pair of dorsally located appendages at posterior end of abdomen (See Appendix 6).
Compound Eye: An eye composed of many hexagonal elements (See Appendix 6).
Cornicles: Elongate processes located dorsally near apex of abdomen.
Costal Margin: The front margin of the wing (See Appendix 2).
Cuneus: A more or less triangular apical section at the basal part of the forewing (Coleoptera, See Appendix 5)
Discal Cell: A cell near central or basal part of wing (See Appendix 2).
Distal: Near or pertaining to that part farthest from the body. In wings, half of wing furthest from body (See Appendix 2).
Dorsal: Pertaining to the back or upper side; top or uppermost.
Dorsoventral: Pertaining to the axis joining the dorsal and ventral sides.
Femora (Femur): The second large leg segment (See Appendix 7).
Filaments: A threadlike appendage.
Forceps: Pincer-like, curved and pointed.
Forewing: The wing closest to the head; the wing in front of the hindwing.
Frenulum: A bristle or group of bristles at humeral angle of hind wing. (Lepidoptera)
Hindwing: The wing closest to the abdomen; the wing behind the fore wing.
Humeral Angle: The angle of the junction where the costa meets the abdomen (See Appendix 2).
Humeral Vein: A branch of Sc that extends into the Humeral Angle of wings (Lepidoptera).
Jugal Lobe: The lobe at base of hind wing, on rear side (Hymenoptera, See Appendix 4).
Lateral: On or pertaining to the right or left side.
Mandible: A jaw (See Appendix 6).
Mesoscotum: The scotum of the middle thorax segment.
Mesosternum: The sternum of the middle thorax segment.
Nodus: A strong cross vein near middle of front border of wing (Odonata, See Appendix 3).
Ocelli: A simple eye (See Appendix 6).
Ovipositor: The egg-laying apparatus found on the posterior of female insects (See Appendix 6).

Pectinate: Bearing processes like the teeth of a comb.
Plumose: Feathery or bearing many long hairs.
Posterior: Hind or rear.
Proboscis: The feeding parts/tube of Lepidoptera, Hymenoptera, Diptera, etc.
Process: A projecting part of the insect.
Pronotum: The dorsal plate of the first thorax segment.
Prosternum: The sternum of the first thorax segment.
Scutellum: A dorsal thoracic sclerite (See Appendix 7).
Stigma: A dark spot formed by a thickening of the wing membrane, located in distal part of wing along front edge (Odonata, See Appendix 3).
Style: A slender elongate process at apex of antennae.
Tarsi (Tarsus): The part of the leg beyond the tibia, usually consisting of 2-5 subdivisions (See Appendix 7).
Terminal: At the end; at posterior end.
Thorax: The body segment behind the head where the wings and legs attach, separated into sections (See Appendix 6).
Venation: Pertaining to the wing veins; thickened lines in the wing.
Ventral: Lower or underneath; pertaining to the underside.
Vertex: Top of head, between compound eyes and in front of occipital structure.
Vestigial: Small, poorly developed or non-functional.