

ROBBER FLIES OF UTAH (DIPTERA: ASILIDAE)

C. Riley Nelson¹

ABSTRACT.—Reported are 158 species of Asilidae (Diptera) in 50 genera from Utah. Keys to subfamilies, genera, and species are given, along with information on seasonal and distributional occurrence in Utah. Seventy-six maps and 56 line drawings show the Utah distribution of each species and illustrate important characters used in the keys. A table summarizes the current status of names used in earlier state lists.

The Asilidae (Diptera) have long attracted the attention of collectors. As a result, numerous specimens have been deposited in collections in the state of Utah. The systematics of the family have been studied rather intensively so that the taxonomic status of most groups is known. The purpose of this study is to assemble the numerous records and to identify the species of asilids caught in Utah.

The catalog of Diptera (Stone et al. 1965) shows that about 50 species of asilids are either listed as occurring in Utah or are included in the broad geographical ranges delineated under a given species. A preliminary examination of the specimens from the Utah State University Entomological Museum revealed that identifications made by prominent workers of the family existed for over 150 different species. A careful examination of col-

lections of asilids from the state revealed 158 species in 50 genera.

REVIEW OF LITERATURE

Brown (1929) published the first paper dealing with Asilidae of Utah. He listed 22 species of robber flies as occurring in Utah, one of which was not determined to species. He included drawings of the genitalia of most of these species. Table 1 summarizes the current status of the species listed by Brown (1929).

Knowlton and Harmston (1938) published a list of Asilidae found in Utah. A summary of the current status of these species is given in Table 2.

A further list of asilids captured in Utah was given by Knowlton, Harmston, and Stains

TABLE 1. Current status of species listed in Brown (1929).

1. <i>Ospriocerus abdominalia</i> (Say)	= <i>O. abdominalis</i>
2. <i>Stenopogon modestus</i> Loew	= <i>S. inquinatus</i>
3. <i>Stenopogon consanguineus</i> Loew	Specimens are <i>Scleropogon neglectus</i>
4. <i>Stenopogon californiae</i> (Walker)	Specimens are <i>S. rufibarbis</i>
5. <i>Stenopogon</i> sp. female	Not enough information
6. <i>Heteropogon ludi</i> (Coquillett)	Wilcox lists as <i>H. senilis</i>
7. <i>Dasyllis fernaldi</i> Back	= <i>Laphria fernaldi</i>
8. <i>Deromyia bigoti</i> (Bellardi)	= <i>Diogmites grossus</i>
9. <i>Proctacanthus arno</i> Townsend	= <i>P. nearno</i>
10. <i>Erax barbatus</i> (Fabricius)	= <i>Efferia albibarbis</i>
11. <i>Erax interruptus</i> (Macquart)	= <i>Triorla interrupta</i>
12. <i>Erax stamineus</i> Williston	= <i>Efferia staminea</i>
13. <i>Erax subpilosus</i> Schaeffer	Neither Wilcox (1966) nor I saw specimens of this species.
14. <i>Mallophora fulviventris</i> Macquart	Unrecognizable to Cole and Pritchard (1964).
15. <i>Mallophora guildiana</i> Williston	= <i>Megaphorus guildiana</i>
16. <i>Promachus bastardii</i> (Macquart)	= <i>P. dimidiatus</i>
17. <i>Promachus nigripes</i> Hine	Specimens are <i>P. aldrichii</i> .
18. <i>Asilus lecythus</i> Walker	Utah specimens are <i>Machimus occidentalis</i> .
19. <i>Asilus tenebrosus</i> Williston	= <i>Machimus griseus</i>

¹Department of Biology, Utah State University, Logan, Utah 84322. Present address: M. L. Bean Museum, Brigham Young University, Provo, Utah 84602.

TABLE 2. Changes in status of species listed in Knowlton and Harmston (1938).

1. <i>Ablautus trifarius</i> Loew	Utah specimen is <i>Omninablautus nigronotum</i>
2. <i>Andrenosoma abdominalis</i> (Brown)	= <i>Cerotainiops abdominalis</i>
3. <i>Asilus callidus</i>	= <i>Machimus callidus</i>
4. <i>A. compositus</i> Hine	= <i>Polacantha composita</i>
5. <i>A. erythrocnemius</i> Hine	Specimens are <i>Machimus paropus</i>
6. <i>A. gracilus</i> Weidemann	Specimens are <i>Polacantha composita</i>
7. <i>A. mesae</i> Tucker	= <i>Negasilus mesae</i>
8. <i>A. occidentalis</i> Hine	= <i>Machimus occidentalis</i>
9. <i>A. tenebrosus</i> Williston	= <i>Machimus griseus</i>
10. <i>Bombomima fernaldi</i> (Back)	= <i>Laphria fernaldi</i>
11. <i>Cyrtopogon callipedilus</i> Loew	No specimens seen; this is a California species; Utah specimens were probably <i>C. montanus</i>
12. <i>Deromyia bigoti</i> Bellardi	<i>Diogmites grossus</i>
13. <i>Dioctria parvula</i> Coquillett	Probably <i>D. henshawi</i>
14. <i>Efferia candida</i> Coquillett	Specimen is <i>E. benedicti</i>
15. <i>Erax</i> spp.	<i>Efferia</i> spp.
16. <i>Erax argyrosoma</i> Hine	Utah specimens are <i>Efferia benedicti</i>
17. <i>Erax barbatus</i> Fabricius	= <i>Efferia albibarbis</i>
18. <i>E. californicus</i>	No specimen seen, specimen was probably <i>Efferia benedicti</i>
19. <i>E. dubius</i> Williston	Nomen nudum
20. <i>E. interruptus</i>	= <i>Triorla interrupta</i>
21. <i>E. knowltoni</i> Bromley	= <i>Efferia benedicti</i>
22. <i>E. pallidulus</i> Hine	Not seen in collections
23. <i>E. texana</i> Banks	Not seen in collections
24. <i>Eucyrtopogon maculosus</i> Coquillett	No specimen seen
25. <i>Heteropogon lautus</i> Loew	Utah specimen is <i>H. maculinervis</i>
26. <i>Mallophora guildiana</i> Williston	= <i>Megaphorus guildiana</i>
27. <i>Mallophora fauricoides</i> Curran	= <i>Mallophora faurix</i>
28. <i>Neoitamus hardyi</i> Bromley	= <i>Asilus auriannulatus</i>
29. <i>Niocles punctipennis</i> Melander	= <i>N. utahensis</i>
30. <i>Ospricerus ventralis</i> (Say)	= <i>O. abdominalis</i>
31. <i>Proctacanthus arno</i> Townsend	= <i>P. nearno</i>
32. <i>P. cacopiloga</i> Hine	= <i>Proctacanthella cacopiloga</i>
33. <i>Promachus nigripes</i> Hine	Utah specimens are <i>P. aldrichii</i>
34. <i>P. quadratus</i> Weidemann	Eastern species; Utah specimen is <i>P. dimidiatus</i>
35. <i>Scleropogon longulus</i> Loew	= <i>Ospricerus longulus</i>
36. <i>Stenopogon helvolus</i> Loew	Specimen is <i>Scleropogon indistinctus</i>
37. <i>Stenopogon neglectus</i> Bromley	= <i>Scleropogon neglectus</i>
38. <i>Stenopogon obscuriventris</i> Loew	Utah specimens are <i>S. martini</i>
39. <i>S. picticornis</i> Loew	= <i>Scleropogon picticornis</i>

(1939). A review of the species from that publication and their current status is given in Table 3.

Johnson's (1936) unpublished master's thesis is an important contribution to the study of the fauna of the state. He listed 73 species as occurring in Utah. Table 4 summarizes the changes in the status of the species listed in Johnson (1936). Johnson's specimens are in the Brigham Young University collection and were examined during this study.

Numerous other records of asilids caught in Utah are scattered throughout the literature. These are listed unmarked under the discussions of individual species.

METHODS

Utah collections of Asilidae were examined at Utah State University, Brigham Young University, the University of Utah, Southern Utah State College, Dixie College, and the College of Eastern Utah. Additionally, a search through literature dealing with Asilidae was made, and records of specimens collected in Utah were included in the synopsis of each species.

Numerous areas throughout the state were visited, and extensive collections of Asilidae were made during this study. Areas which received particular attention were: Washing-

TABLE 3. Changes in status of species listed in Knowlton, Harmston, and Stains (1939).

1. <i>Anisopogon lautus</i> Loew	Probably <i>Heteropogon senilis</i>
2. <i>Asilus avidus</i> Van der Wulp	Specimens are <i>Machimus adustus</i>
3. <i>A. belli</i> Curran	= <i>Negasilus belli</i>
4. <i>A. delicatulus</i> Hine	Specimen unidentifiable
5. <i>A. erythrocnemius</i> Hine	Specimens are <i>Machimus paropus</i>
6. <i>A. occidentalis</i> Hine	= <i>Machimus occidentalis</i>
7. <i>A. paropus</i> Walker	= <i>Machimus paropus</i>
8. <i>Bombomina fernaldi</i> Back	= <i>Laphria fernaldi</i>
9. <i>Dioctria pleuralis</i> Banks	Specimens are <i>Dioctria vera</i>
10. <i>Efferia candida</i> Coquillett	Specimens are <i>E. davis</i>
11. <i>Erax barbatus</i> Fabricius	= <i>Efferia albibarbis</i>
12. <i>E. bicaudatus</i>	Specimens are <i>Efferia frewingi</i>
13. <i>E. dubius</i> Williston	Nomen nudum
14. <i>E. zonatus</i> Hine	= <i>Efferia zonata</i>
15. <i>Holopogon phaeonotus</i> Loew	Specimens are <i>H. albipilosus</i>
16. <i>H. seniculus</i> Loew	Specimens are <i>H. albipilosus</i>
17. <i>Laphystia sexfasciatus</i> Say	Specimen is <i>L. tolanti</i>
18. <i>Mallophora bromleyi</i> Curran	= <i>M. fautrix</i>
19. <i>M. purdens</i> Pritchard	= <i>Megaphorus willistoni</i>
20. <i>M. pulchra</i> Pritchard	= <i>Megaphorus pulcher</i>
21. <i>Neoitamus hardyi</i> Bromley	= <i>Asilus auriannulatus</i>
22. <i>Nicocles punctipennis</i> Melander	= <i>N. utahensis</i>
23. <i>Ospriocerus ventralis</i> Coquillett	= <i>O. abdominalis</i> (Say)
24. <i>Proctacanthus arno</i> Townsend	= <i>P. nearno</i> Martin
25. <i>Promachus nigripes</i> Hine	Specimens are <i>P. aldrichii</i>
26. <i>Stenopogon helvolus</i> Loew	Specimens are <i>Scleropogon coyote</i>
27. <i>Stenopogon neglectus</i> Bromley	= <i>Scleropogon neglectus</i>
28. <i>Stenopogon obscuriventris</i> Loew	Specimens are <i>S. martini</i>
29. <i>S. picticornis</i> Loew	= <i>S. picticornis</i>

ton County, the only area of the state where species of Mohave Desert origins could be collected; the Raft River Mountains; Cache County; Box Elder County; Juab County; Emery County; Grand County; and San Juan County.

The taxonomic synopsis presented in this paper consists of information regarding original citation and author, type locality, type repository, all of which were obtained from the literature. The county and seasonal distributions of each species were taken from specimen labels. The seasonal distributional data are expressed as a range of earliest and latest known collection dates for Utah specimens.

Keys to subfamilies, genera, and species were constructed using published information and new insights. A map was produced showing the distribution of each species listed, and 56 figures were drawn using a camera lucida on a Wild M8 stereomicroscope. The figures illustrate important characters used in the keys.

KEYS

Key to the Subfamilies of Utah Asilidae

1. R_{2+3} ending in costa (Figs. 40, 46) 2
- R_{2+3} joining R_1 , closing cell r_1 (Fig. 43) 3
- 2(1). Abdominal segment 2 elongate, five or more times as long as wide; resembling, somewhat, small damselflies Leptogastrinae
- Abdominal segment 2 shorter, not more than five times as long as wide; not particularly resembling damselflies Dasypogoninae
- 3(2). Antennae without a terminal style, ending bluntly Laphriinae
- Antennae bearing a terminal style Asilinae

Key to the Genera of Utah Leptogastrinae and Dasypogoninae

(Modified from Wood 1981)

1. Abdominal segment 2 elongate, five or more times as long as wide; abdomen very thin and elongate *Leptogaster* Meigen²
- Abdominal segment 2 shorter, not more than five times as long as wide; abdomen generally shorter and stout 2
- 2(1). Foretibia bearing a terminal, clawlike spur on ventral surface which is thicker and sigmoid (Figs. 54–55) 3

²Much difficulty was met using the key given by Martin (1957). Although several species of *Leptogaster* are present in Utah collections, reliable species determinations were not made. The distribution of this genus in Utah is given in Fig. 100.

TABLE 4. Changes in status of species listed in Johnson (1936).

1. <i>Ablautus squamipes</i> Cole	Specimens are <i>A. minimus</i>
2. <i>Andrenosoma similis</i> (Brown)	= <i>Cerotainiops abdominalis</i>
3. <i>Asilus avidus</i> Van der Wulp	Specimens are <i>Machimus adustus</i>
4. <i>A. brevicornis</i> Hine	= <i>Neoitamus brevicornis</i>
5. <i>A. mesae</i> (Tucker)	= <i>Negasilus mesae</i>
6. <i>A. occidentalis</i> Hine	= <i>Machimus occidentalis</i>
7. <i>A. paropus</i> Walker	= <i>Machimus paropus</i>
8. <i>A. tenebrosus</i> Williston	Specimens are <i>Machimus griseus</i>
9. <i>Bombomima fernaldi</i> (Back)	= <i>Laphria fernaldi</i>
10. <i>Chrysoceria pictitarsis</i> (Bigot)	= <i>Callinicus pictitarsis</i>
11. <i>Cophura texana</i> Bromley	No specimens seen
12. <i>Cyrtopogon dasyllis</i> Williston	Specimens are <i>C. dasylloides</i>
13. <i>C. leucozona</i> Loew	= <i>C. montanus</i>
14. <i>C. nugator</i> Osten Sacken	Specimens are <i>C. banksi</i>
15. <i>Diogmites pulchra</i> (Back)	Specimens are <i>Diogmites grossus</i>
16. <i>Ecthopoda</i> sp.	No label; spelling <i>Ecthodopa</i>
17. <i>Erax argyrosoma</i> (Hine)	Specimens are <i>Efferia benedicti</i>
18. <i>Erax barbatus</i> Fabricius	= <i>Efferia albibarbis</i> (Macquart)
19. <i>Erax bicaudatus</i> Hine	Probably <i>Efferia frewingi</i>
20. <i>Erax candidus</i> (Coquillett)	Specimens are <i>Efferia davisii</i>
21. <i>Erax canellus</i> Bromley	Specimens are <i>Efferia benedicti</i>
22. <i>Erax cingulatus</i> Bellardi	No specimens seen; not Nearctic
23. <i>Erax dubius</i> (Williston)	Nomen nudum
24. <i>Erax interruptus</i> (Macquart)	= <i>Triorla interrupta</i>
25. <i>Erax pilosus</i> Hine	No specimens seen
26. <i>Erax stramineus</i> Williston	Specimens are <i>Efferia benedicti</i>
27. <i>Holopogon seniculus</i> Loew	Specimens are <i>Holopogon albipilosus</i>
28. <i>Laphystia limatulus</i> Coquillett	Specimen is <i>Laphystia rubra</i>
29. <i>L. rufiventris</i> Curran	Specimens are <i>Laphystia tolandi</i>
30. <i>Lestomyia fraudigera</i> Williston	Specimen is <i>Lestomyia sabulona</i>
31. <i>Mallophora bromleyi</i> Curran	= <i>Mallophora faultrix</i>
32. <i>Proctacanthella leucopogon</i> (Will.)	No specimens seen
33. <i>Proctacanthus arno</i> Townsend	= <i>Proctacanthus nearno</i>
34. <i>Promachus bastardii</i> (Macquart)	Damaged; probably <i>P. dimidiatus</i>
35. <i>P. nigripes</i> Hine	Specimens are <i>P. aldrichii</i>
36. <i>Stenopogon californiae</i> (Walker)	Specimens are <i>S. rufibarbis</i>
37. <i>S. helvolus</i> (Loew)	Probably <i>Scleropogon neglectus</i>
38. <i>S. obscuriventris</i> Loew	Specimens are <i>S. rufibarbis</i>

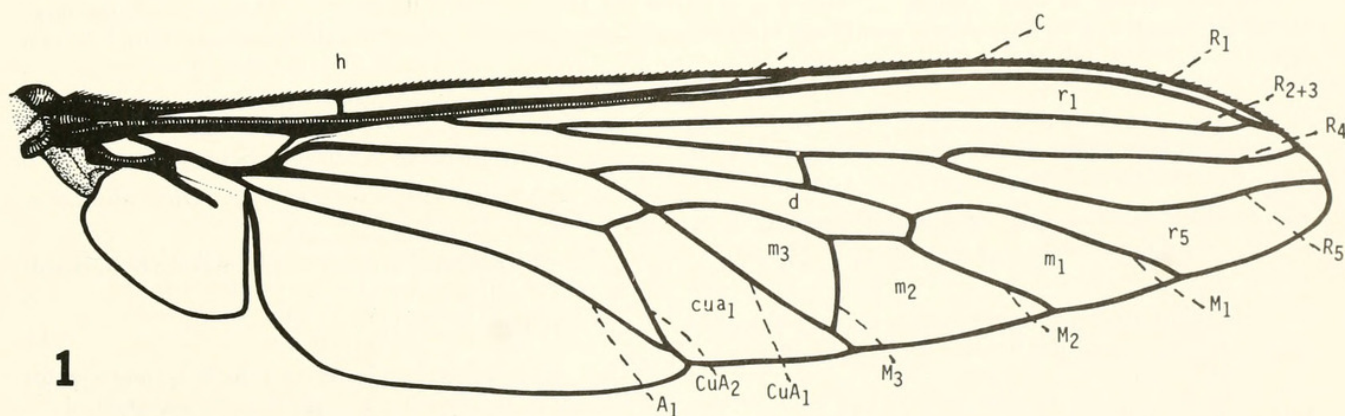
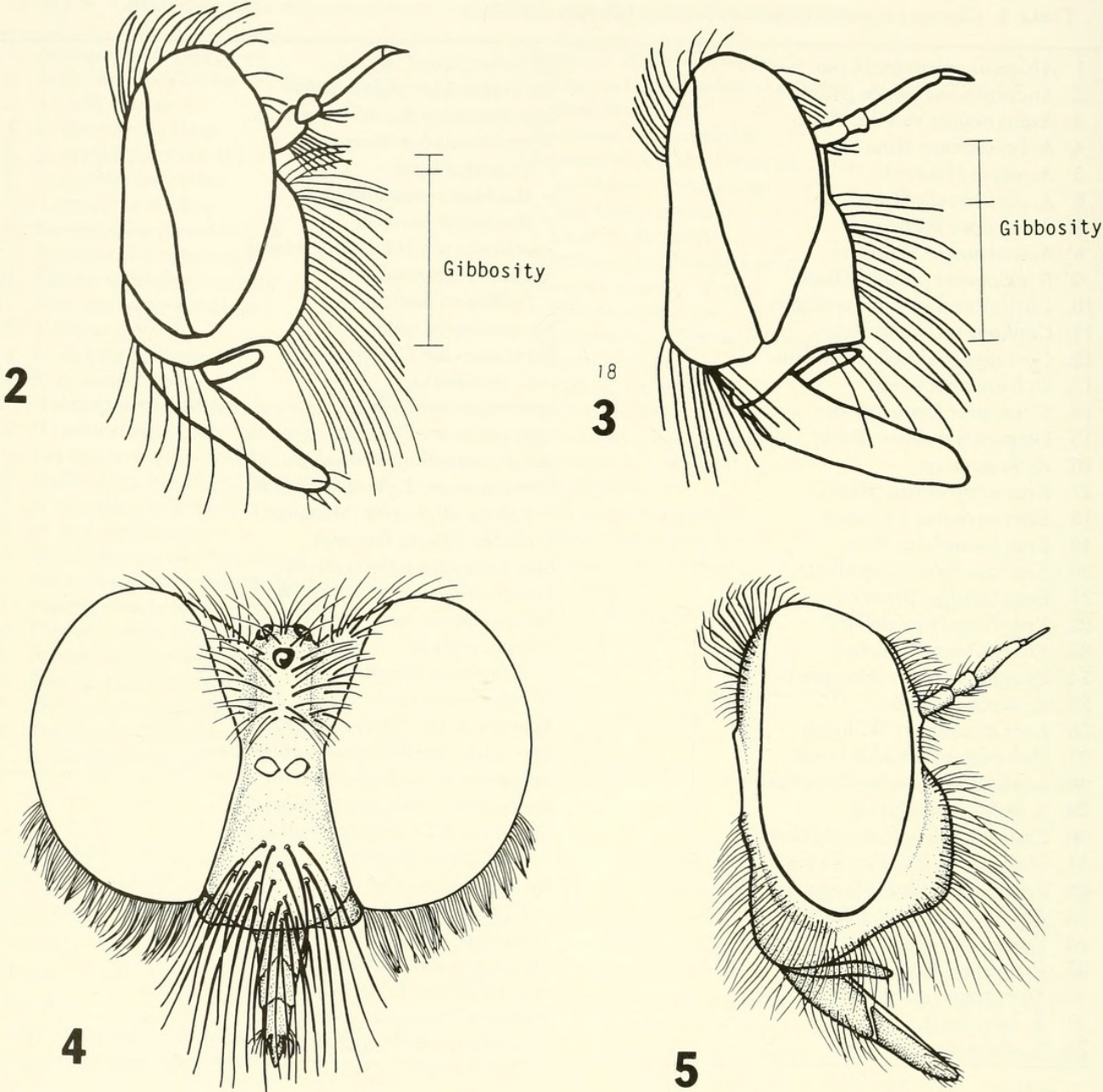


Fig. 1. *Proctacanthus nearno* Martin, right wing: A₁, first anal vein; C, costa; CuA₁, first anterior branch of cubitus; cua₁, anterior cubital cell; CuA₂, second anterior branch of cubitus; d, discal cell; h, humeral crossvein; M₁, first branch of media; m₁, first medial cell; M₂, second branch of media; m₂, second medial cell; M₃, third branch of media; m₃, third medial cell; R₁, first branch of radius; r₁, first radial cell; R₂₊₃, fusion of second and third branches of radius; r₃, third radial cell; R₄, fourth branch of radius; r₄, fourth radial cell; R₅, fifth branch of radius; r₅, fifth radial cell; Sc, subcosta.



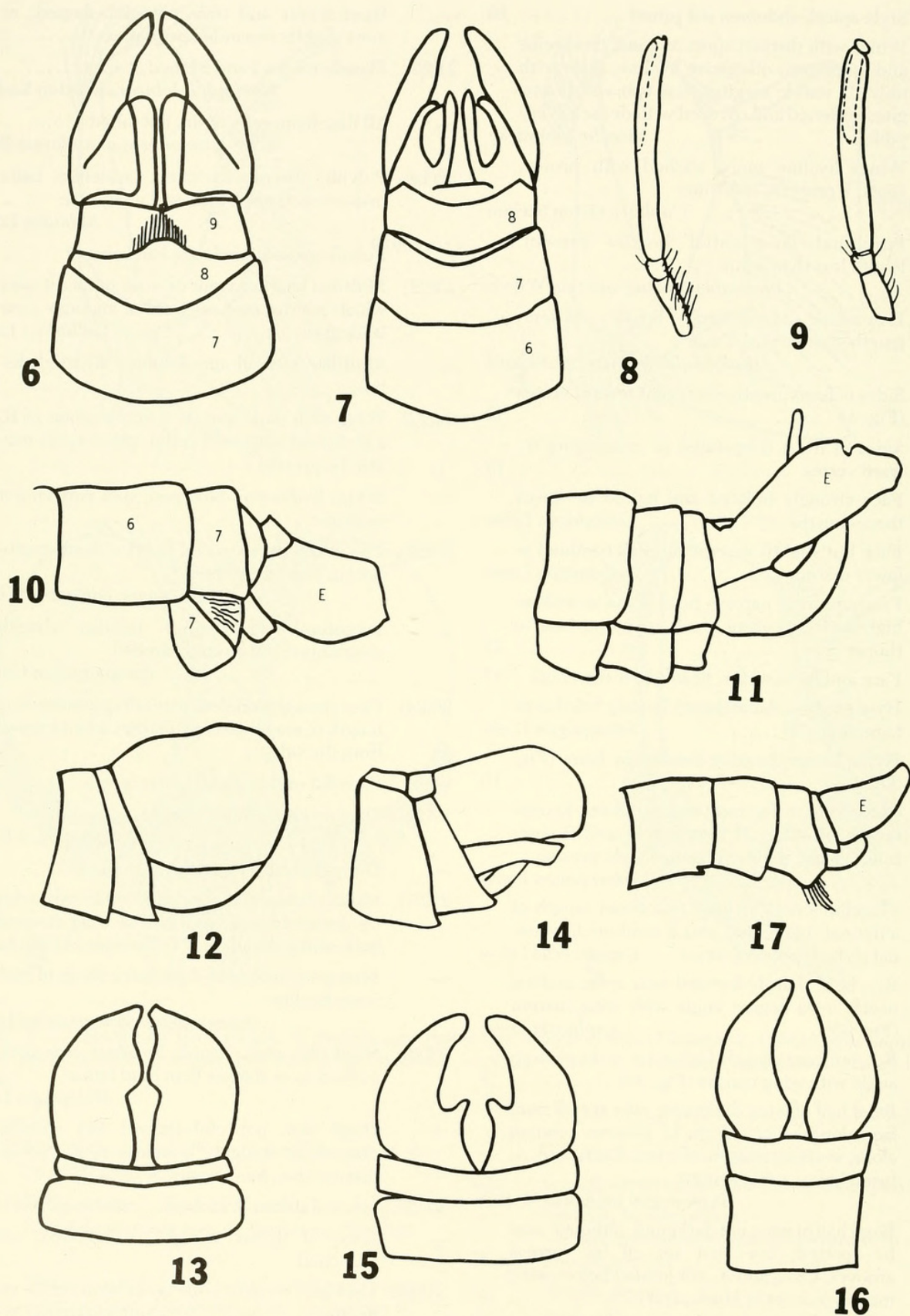
Figs. 2-5. Heads of Utah Asilidae: 2, *Stenopogon rufibarbis* Bromley, lateral aspect; 3, *Stenopogon inquinatus* Loew, lateral aspect; 4, *Lasiopogon monticola* Melander, cephalic aspect; 5, *Neoitamus brevicornis* (Hine), lateral aspect.

—	Foretibia without a terminal differentiated spur on ventral surface	12	—	Cell m ₃ closed; one flagellomere	6
3(2).	Differentiated spur of foretibia meeting a raised denticulate area on basitarsus (Fig. 54)	4	6(5).	Scutellar bristles present	<i>Diognites</i> Loew
—	Differentiated spur of foretibia not meeting a differentiated denticulate area on basitarsus (Fig. 55)	7	—	Scutellar bristles absent	<i>Blepharepium sonorensis</i> Papavero & Bernardi
4(3).	Face inflated and haired on lower two-thirds	<i>Lestomyia sabulona</i> Osten Sacken	7(3).	Pulvilli present	8
—	Face flat, hair confined to lower one-third . . .	5	—	Pulvilli absent	11
5(4).	Cell m ₃ open; two flagellomeres present, the second being small, bearing a pit with apical bristle	<i>Saropogon mohawki</i> Wilcox	8(7).	Face inflated on lower two-thirds or more; anterior mesonotum bearing a manelike crest of hairs on midline	<i>Comantella</i> Curran
			—	Face flat or slightly rounded; mesonotal crest absent	9
			9(8).	Style of antenna anteapical, in a notch at about midlength of dorsal surface of flagellomere 1; abdomen pitted	<i>Taracticus ruficaudus</i> Curran

- Style apical; abdomen not pitted 10
- 10(9). Wings with distinct spots on most crossveins and furcations, otherwise hyaline; male with only six visible tergites, last two visible tergites widened and covered with dense silvery pollen *Nicocles* Jaennicke
- Wings hyaline more washed with brown, spots, if present, indistinct *Cophura* Osten Sacken
- 11(7). Presutural dorsocentral bristles present; length less than 5 mm *Omninablautus nigronotum* Wilcox
- Presutural dorsocentral bristles absent; length greater than 7 mm *Hodophylax basingeri* Pritchard
- 12(2). Sides of frons greatly divergent toward vertex (Fig. 4) 13
- Sides of frons subparallel or converging toward vertex 14
- 13(12). Face strongly inflated and haired on lower three-fourths *Lasiopogon* Loew
- Face but slightly convex; mystax confined to lower margin *Stichopogon* Loew
- 14(12). Face and frons narrow; head about as wide as high and appearing small in proportion to thorax 15
- Face and frons wider; head wider than high 17
- 15(14). Hypopleuron (katatergite) lacking bristles or hairs (Fig. 31) *Stenopogon* Loew
- Hypopleuron bearing bristles or hairs (Fig. 30) 16
- 16(15). Flagellomere 1 at most one and three-fourths length of antennal segments 1 and 2 combined; long, slender terminal style present *Scleropogon* Loew
- Flagellomere 1 at least two times length of antennal segments 1 and 2 combined; terminal style, if present, short ... *Ospriocerus* Loew
- 17(14). R_{2+3} bent sharply forward near apex, making nearly a 90 degree angle with wing margin (Fig. 45) *Laphystia* Loew
- R_{2+3} not bent sharply forward to make such an angle with wing margin (Fig. 40) 18
- 18(17). Basal half of wing darkened; eyes set off from face along lower margin by grooves running along vertical margin of eyes; CuA_2 and A_1 fused before wing margin *Haplopogon utahensis* Wilcox
- Basal half of wing not darkened, although may be spotted; eyes not set off by vertical grooves; CuA_2 and A_1 not joining before wing margin (except in *Myelaphus*) 19
- 19(18). Mystax limited to lower one-third of face or with only a few hairs near antennae in addition to lower mystax 20
- Mystax extending more than halfway up face 22
- 20(19). Hind femur and tibia club-shaped; R_4 reaching wing margin anterior to wing tip *Dioctria* Meigen
- Hind femur and tibia not club-shaped, at most slightly expanded near apex 21
- 21(20). Flagellomeres 1 and 2 lobed at apex *Myelaphus lobicornis* Osten Sacken
- All flagellomeres simple, not lobed *Dicolonus sparsipilosum* Back
- 22(19). Pulvilli absent; flattened, scalelike hairs present on thorax, legs, and wing base *Ablautus* Loew
- Pulvilli present; scalelike hairs absent 23
- 23(22). Midtibia bearing a pair of stout spines at apex which are directed outward at an angle near 90 degrees *Callinicus* Loew
- Midtibia with all apical spines directed distally 24
- 24(23). Wing with dark spot on r-m, furcation of R_4 and R_5 and at apex of cell d, other spots may also be present 25
- Wings hyaline or darkened; spot pattern not as above 26
- 25(24). Presutural dorsocentral bristles stout; mesonotum strongly arched *Metapogon carinatus* Wilcox
- Presutural dorsocentral bristles absent; mesonotum not strongly arched *Eucyrtopogon* Curran
- 26(24). Face strongly inflated, extending greater than length of scape past eye margin when viewed from the side 27
- Face flat or but slightly convex 29
- 27(26). Dorsocentrals weak, hairlike *Cyrtopogon* Loew
- Dorsocentrals bristlelike, prominent 28
- 28(27). Mystax composed of bristles; male with wing tip darkened and basal half of wing covered with white bloom ... *Coleomyia alticola* James
- Mystax composed of weak hairs; wings of both sexes hyaline *Nannocyrtopogon aristatus* James
- 29(26). Hind tibia club-shaped, broadest near apex, as thick as or thicker than hind femur *Holopogon* Loew
- Hind tibia not club-shaped but spindle-shaped or straight, broadest near middle, thinner than hind femur 30
- 30(29). Hairs of thorax branched ... *Heteropogon* Loew
- Hairs of thorax straight or crinkled, not branched 31
- 31(30). Legs and tergites with greenish metallic reflections *Sintoria cazieri* Wilcox
- Legs and tergites without metallic reflections *Wilcoxia painteri* Wilcox

Key to the Species of Utah *Ablautus* Loew
Including *Omninablautus* Pritchard

(Modified from Wilcox 1966c)



Figs. 6–17. Utah Asilidae: 6, male genitalia of *Machimus occidentalis* (Hine), ventral aspect; 7, male genitalia of *Machimus callidus* (Williston), ventral aspect; 8, antenna of *Ospriocerus abdominalis* (Say); 9, antenna of *Ospriocerus vallensis* Martin; 10, male genitalia of *Regasilus blantonii* Bromley, lateral aspect, E = epandrium; 11, male genitalia of *Neomochtherus lepidus* (Hine), lateral aspect, E = notched epandrium; 12, male genitalia of *Lasiopogon aldrichii* Melander, lateral aspect; 13, surstyli of *Lasiopogon aldrichii* Melander from below; 14, male genitalia of *Lasiopogon monticola* Melander, lateral aspect; 15, surstyli of *Lasiopogon monticola* Melander from below; 16, surstyli of *Lasiopogon cinereus* Cole from below; 17, male genitalia of *Asilus auriannulatus* (Hine), lateral aspect, E = epandrium.

- 1. Mesonotum with black, shining spots on sides
..... *Omninablautus nigronotum* Wilcox
- Mesonotum entirely pollinose 2
- 2(1). Face, frons, thorax, and legs without scalelike hairs 3
- Face, frons, thorax, and legs with scalelike hairs 4
- 3(2). Frons golden brown pollinose, male with scalelike hairs of foretarsi black laterally and pale brown medially, hind tibia and femur black ...
..... *mimus* Osten Sacken
- Frons white pollinose, male with scalelike hairs of foretarsi all brown, apex of hind femur and middle of hind tibia reddish *rufotibialis* Back
- 4(2). Frons white or slightly yellowish pollinose, scalelike hairs above antennae on frons not limited to margins of eyes *flavipes* Coquillett
- Frons golden brown pollinose; scale hairs of frons limited to margins of eyes . *coquilletti* Wilcox

Key to the Species of Utah *Callinicus* Loew

(Modified from Wilcox 1936a)

- 1. Femora black, central stripe of mesonotum reaching scutellum, presutural black spots extending to the lateral margins *pollenius* Cole
- Femora yellow, central stripe of mesonotum reaching scutellum, presutural black spots small and isolated from lateral margin by golden pollen *pictitarsis* Bigot

Key to the Species of Utah *Comantella* Curran

(Modified from James 1937b)

- 1. Style one-third as long as antennal segment 3; venter black-haired, at least on anterior segments 2
- Style one-half as long as antennal segment 3; venter with all hairs white *pacifica* Curran
- 2(1). Thoracic mane set on a well-defined black vitta; hairs of mystax black on entire length
..... *rotgeri* James
- Thoracic mane set on poorly defined black vitta; hairs of mystax with tips white *fallei* (Back)

Key to the Species of Utah
Cophura Osten Sacken

(Modified from Pritchard 1943)

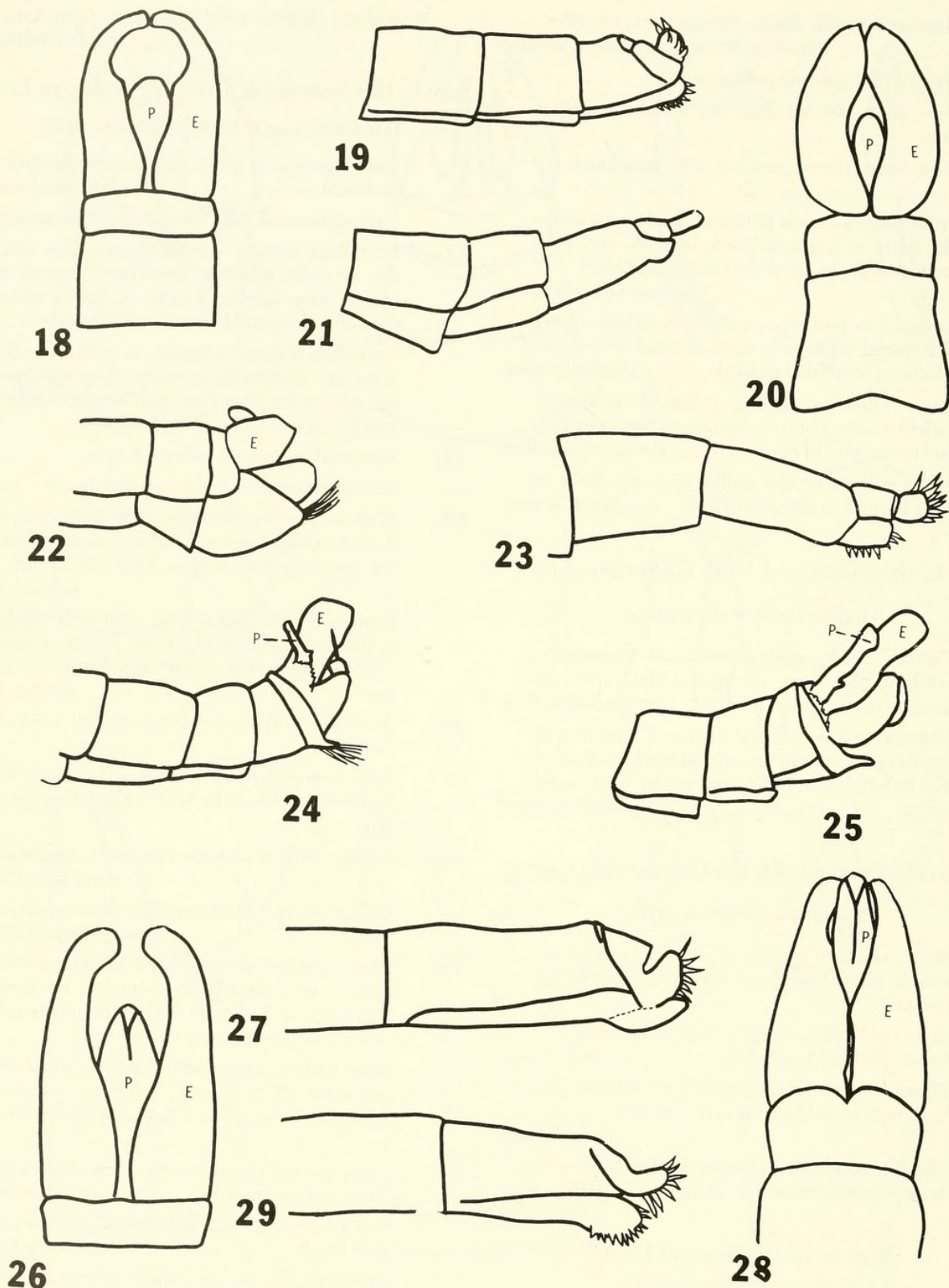
- 1. Scutellum entirely pollinose, base of tibia with dark yellow band *pollinosa* Curran
- Scutellum shining black, base of tibia without dark yellow band 2
- 2(1). Wings hyaline *albosetosa* Hine
- Wings brownish 3
- 3(2). Scutellum clothed with short, stout, dark bristles *brevicornis* (Williston)

- Scutellum clothed with long, thin, light hairs
..... *scitula* (Williston)

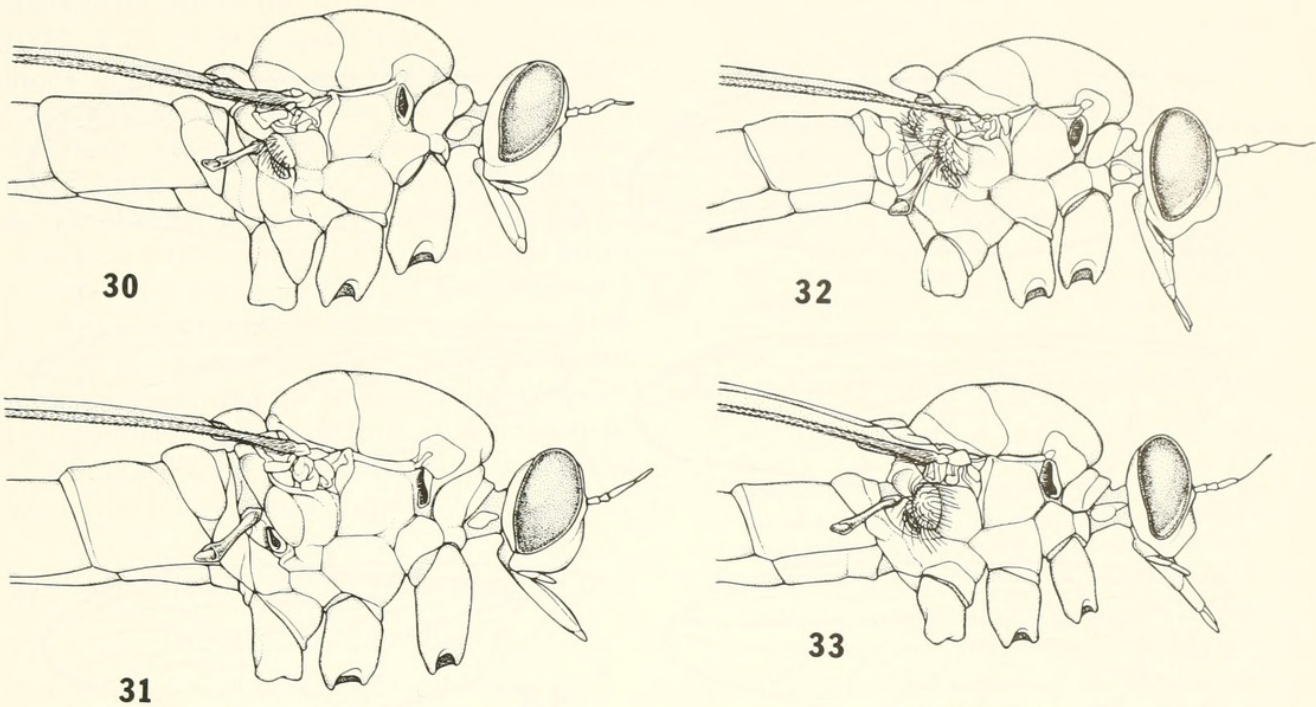
Key to the Species of Utah *Cyrtopogon* Loew

(Modified from Wilcox and Martin 1936)

- 1. Last segment of male foretarsus extremely flattened *albifacies* Johnson
- Last segment of male foretarsus not flattened 2
- 2(1). Scutellum convex, mostly shining; face usually strongly gibbous; antennae situated at about three-fourths height of head; more densely pilose and less pollinose species 3
- Scutellum flattened, largely or entirely pollinose; face not usually strongly gibbous; antennae situated at about one-half height of head; less pilose and more pollinose species 13
- 3(2). Antennal segment 3 yellowish red 4
- Antennal segment 3 black or dark brown 5
- 4(3). Abdomen with yellowish orange hairs, denser in male; pollinose fasciae of abdomen yellowish; mystax mostly golden; length 9–12 mm .
..... *auratus* Cole
- Abdomen with hairs light yellowish silver; pollinose fasciae of abdomen silver; mystax whitish yellow with much black; length 10–15 mm *pulcher* Back
- 5(3). Abdomen with dense orange-yellow hairs on dorsum 6
- Abdomen with dense hairs (may be somewhat yellowish or black) limited to the lateral margins 7
- 6(5). Orange hairs of abdomen limited to segments 1–4 *curtistylus* Curran
- Orange hairs of abdomen on at least segments 1–5 *dasylloides* Williston
- 7(5). Male with disc of broad black hairs on at least apical two segments of midtarsus; foretarsal segments 2–5 of male with a differentiated, dense, narrow fringe of silvery hairs 8
- Male without disc of black hairs on apical two segments of midtarsus; foretarsus of male without a differentiated fringe of silvery hairs 9
- 8(7). Long hairs of lateral margins of abdomen entirely yellowish white ... *plausor* Osten Sacken
- Long hairs of lateral margins of abdomen in part black *willistoni* Curran
- 9(7). Wing of male with apex black, apex of anal cell also black; wing of female darkened somewhat in same areas; pleura largely shining
..... *bimacula* Walker
- Wing without black spots; pleura extensively pollinose 10
- 10(9). Tibiae and tarsi more or less reddish, at least below, rarely male with only underside of tarsi reddish 11
- Tibiae and tarsi either both black or with tibiae all black and foretarsi yellow with white hairs 12



Figs. 18-29. Utah Asilidae, terminalia: 18, male genitalia of *Philonicus arizonensis* (Williston), dorsal aspect, E = epandrium, P = proctiger; 19, female genitalia of *Philonicus arizonensis* (Williston), lateral aspect; 20, male genitalia of *Polacantha composita* (Hine), dorsal aspect, E = epandrium, P = proctiger; 21, female genitalia of *Polacantha composita* (Hine), lateral aspect; 22, male genitalia of *Proctacanthella cacopiloga* (Hine), lateral aspect, E = epandrium; 23, female genitalia of *Proctacanthella cacopiloga* (Hine), lateral aspect; 24, male genitalia of *Machimus griseus* Hine, lateral aspect, with left epandrium removed, E = epandrium unnotched, P = proctiger without ventral process; 25, male genitalia of *Machimus adustus* Martin, lateral aspect, with left epandrium removed, E = epandrium, P = proctiger with ventral process; 26, male genitalia of *Proctacanthus nearno* Martin, dorsal aspect, E = epandrium, P = proctiger; 27, female terminalia of *Proctacanthus nearno* Martin, lateral aspect; 28, male genitalia of *Proctacanthus micans* Schiner, dorsal aspect, E = epandrium, P = proctiger; 29, female terminalia of *Proctacanthus micans* Schiner, lateral aspect.



Figs. 30–33. Utah Asilidae, lateral aspect of head and thorax: 30, *Scleropogon indistinctus* (Bromley) showing hairs on katatergite (hypopleuron); 31, *Stenopogon inquinatus* Loew showing bare katatergite (hypopleuron); 32, *Machimus occidentalis* (Hine) showing hairs on both katatergite and anatergite; 33, *Promachus albifacies* Williston showing hairs on katatergite and bare anatergite.

- 11(10). Mystax largely black; foretarsus of male yellowish
..... *jemezi* Wilcox & Martin

— Mystax largely white, particularly above
(some females with a few black hairs above);
foretarsus of male black *montanus* Loew

12(10). Foretarsus of male yellowish with white hairs;
mystax of male white above ... *rufotarsus* Back

— Foretarsus of male black with black hairs;
mystax all black ... *stenofrons* Wilcox & Martin

13(2). Pollinose fasciae of abdominal segment 1 en-
tire or nearly so 14

— Pollinosity of abdominal segment 1 limited to
patches near lateral margins, not extending
medially across segment 16

14(13). Tibiae and femora reddish below; mystax
black except for a few central, white hairs ...
..... *profusus* Osten Sacken

— Tibiae and femora black, midtibia sometimes
reddish in male; mystax white above, black
below 15

15(14). Pollinosity of abdominal segments narrowly
interrupted along dorsal midline
..... *thompsoni* Cole

— Pollinosity of abdominal segments entire but
with central spot on several segments lacking
pollen *ablautoides* Melander

16(13). Scutellar hairs in large part white; pollinose
fasciae of abdominal segments extending
anteriorly along lateral margins
..... *idahoensis* Wilcox & Martin
- Scutellar hairs all black, pollinose fasciae of
abdominal segments not extending forward .
..... *banksi* Wilcox & Martin
- Key to the Species of Utah *Dioctria* Meigen

(Modified from Adisoemarto and Wood 1975)

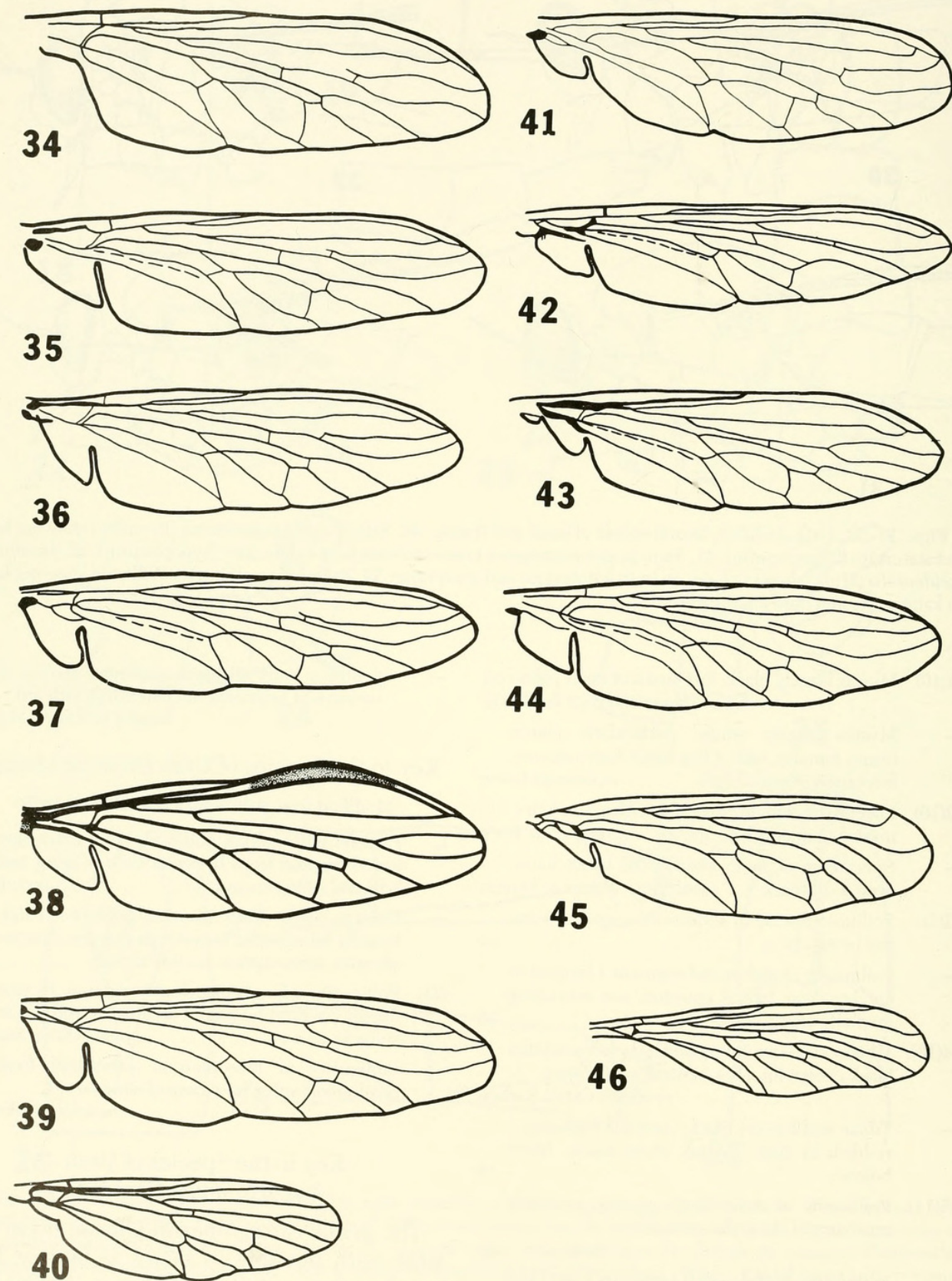
1. Pleuron with golden pollinose band extending
uninterrupted from between base of wing and
humeral callus to coxa *vera* Back

— Pleuron with discontinuous pollinose band,
broadly interrupted on anterior margin of meso-
pleuron; interruption as wide as high 2

2(1). Pollinosity of mesopleuron restricted to and
mostly covered by haired area near prothoracic
spiracle *pusio* Osten Sacken

— Pollinosity of mesopleuron extending from
prothoracic spiracle to base of wing
..... *henshawii* Johnson
- Key to the Species of Utah
Eucyrtopogon Curran

The genus *Eucyrtopogon* Curran occurs in
Utah with possibly as many as four or five
species represented. The Curran (1923a) key
easily distinguishes one species, *E. comantis*
Curran, by the presence of a medial crest of
white hairs on the mesonotum of the males.
The other representatives of this genus in the
state do not key out well. There are only eight



Figs. 34-46. Utah Asilidae, right wing: 34, *Efferia aestuans* (Linnaeus); 35, *Efferia albibarbis* (Macquart); 36, *Efferia apache* Wilcox; 37, *Efferia benedicti* (Bromley); 38, *Efferia costalis* (Williston); 39, *Efferia pernicus* Coquillett; 40, *Cyrtopogon willistoni* Curran; 41, *Efferia tucsoni* Wilcox; 42, *Promachus albifacies* Williston; 43, *Machimus occidentalis* (Hine); 44, *Efferia frewingi* Wilcox; 45, *Laphystia tolandi* Wilcox; 46, *Leptogaster* sp. from Clear Creek, Raft River Mountains, Box Elder Co., Utah.

specimens before me from the collections at BYU, UU, SUSC, and CEU. These specimens seem to represent three distinct species. The specimens from USU have been sent to R. Lavigne at the University of Wyoming, as he is at present studying the genus. Seven of the USU specimens are labeled *E. nebulo* as determined by Bromley; other specimens are simply labeled *Eucyrtopogon* sp. Any determination of the species in Utah (except *E. comantis*) would be very tenuous on my part, due to the small number of specimens which I have seen; thus, determinations of *Eucyrtopogon* from Utah must await the work which Lavigne is preparing.

Key to the Species of Utah *Heteropogon* Loew
(Modified from Wilcox 1965)

- 1. Scutellum without marginal bristles; wing with dark spots on crossveins and furcations *maculinervis* James
- Scutellum with marginal bristles; wings hyaline 2
- 2(1). Scutellum polished on hind margin, disc of scutellum pollinose; terminal abdominal segments red *stonei* Wilcox
- Scutellum entirely pollinose, sometimes thinly so, subshining black; terminal abdominal segments black 3
- 3(2). Black bristles of mystax extending greater than one-third distance from oral margin to antennae 4
- Black bristles of mystax confined to oral margin extending less than one-third distance from oral margin to antennae 5
- 4(3). Male with brush of black hairs in basal third of midtibia; hairs of mystax both black and white; scutellar bristles black *senilis* Bigot
- Males without brush of black hairs on midtibiae; hairs of mystax all white; scutellar bristles black species 1
- 5(3). Bristles of thorax and scutellum white, rarely one or two presutural black bristles; bristles of mystax black and white, white bristles above *martini* Wilcox
- Bristle of thorax both black and white; bristles of scutellum black; bristles of mystax all black *arizonensis* Wilcox

Key to the Species of Utah *Holopogon* Loew
(Modified from Martin 1959)

- 1. Mesonotum without presutural bristles laterally *caesariatus* Martin
- Mesonotum with two or more presutural bristles laterally 2

- 2(1). Scutellum lacking pollen on posterior portion of disc near margin *wilcoxi* Martin
- Scutellar disc pollinose (narrow margin may appear to be lacking pollen) 3
- 3(2). Scutellar disc lacking hair *currani* Martin
- Scutellar disc with a few to many hairs 4
- 4(3). Anterior mesonotal hairs sparse, erect, mostly brown *mingusae* Martin
- Anterior mesonotal hairs dense, somewhat recumbent, white *albipilosus* Curran

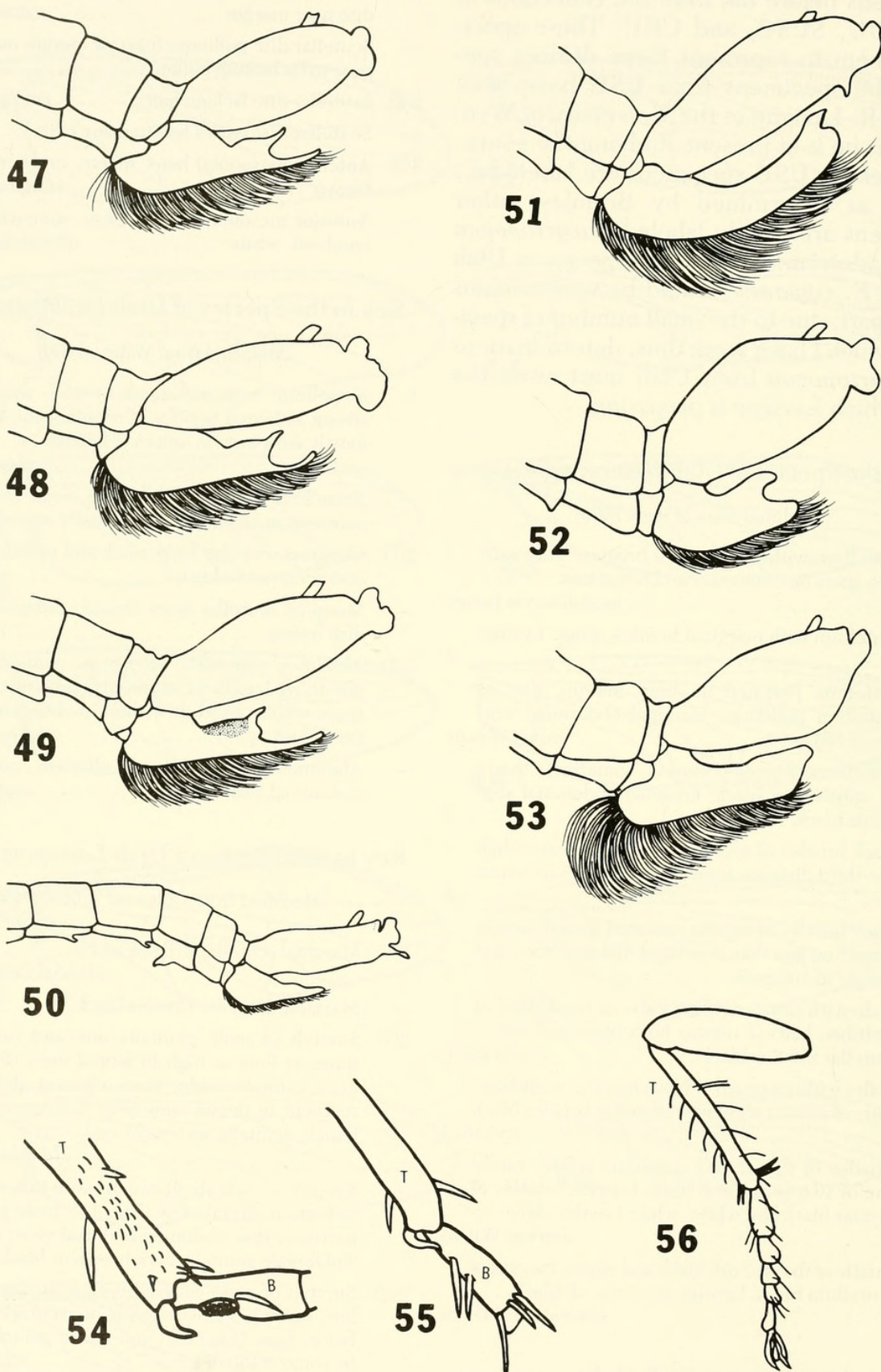
Key to the Species of Utah *Laphystia* Loew
(Modified from Wilcox 1960)

- 1. Scutellum with marginal bristles nearly as strong as lateral bristles of mesonotum; femora mostly dark brown, apices yellowish *tolandi* Wilcox
- Scutellum with marginal hairs weak and procumbent or absent; femora usually concolorous . . . 2
- 2(1). Marginal scutellar hairs weak and procumbent; abdomen not reddish 3
- Marginal scutellar hairs absent; abdomen reddish brown *rubra* Hull
- 3(2). Abdomen yellowish, fasciae on segments 3–5 one-third length of segments; femora of both sexes wholly reddish; pollen of abdominal fasciae white *utahensis* Wilcox
- Abdomen brown, femora yellowish, pollen of abdominal fasciae yellow *annulata* Hull

Key to the Species of Utah *Lasiopogon* Loew
(Modified from Cole and Wilcox 1938)

- 1. Marginal scutellar bristles white *albidus* Cole & Wilcox
- Marginal scutellar bristles black 2
- 2(1). Surstyli of male genitalia one and one-third times as long as high in lateral view (Fig. 12); male genitalia wider than adjacent abdominal segment in dorsal view (Fig. 13); sternite 9 of female genitalia amber colored *aldrichii* Melander
- Surstyli of male about two or more times as long as high in lateral view (Fig. 14), male genitalia narrower than abdomen in dorsal view; sternite 9 of female genitalia dark brown or black 3
- 3(2). Surstyli of male covered with ash-colored pollen; surstyli without tooth on ventral margin before base (Fig. 16) (Note: male genitalia may be rotated 180 degrees) *cinereus* Cole
- Surstyli of male shining black or brown, surstyli with prominent tooth on ventral margin near base (Fig. 15) *monticola* Melander

Key to the Species of Utah *Nicocles* Jaenicke
(Modified from Wilcox 1946)



Figs. 47-56. Utah Asilidae, lateral aspect of male terminalia and legs: 47, male terminalia of *Efferia utahensis* (Bromley); 48, male terminalia of *Efferia frewingi* Wilcox; 49, male terminalia of *Efferia mortensoni* Wilcox; 50, male terminalia of *Efferia tucsoni* Wilcox; 51, male terminalia of *Efferia bicolor* (Bellardi); 52, male terminalia of *Efferia albibarbis* (Macquart); 53, male terminalia of *Efferia zonata* (Hine); 54, foretibia and basitarsus of *Diogmites grossus* Bromley, B = basitarsus, T = tibia; 55, foretibia and basitarsus of *Cophura scitula* Williston, B = basitarsus, T = tibia; 56, middle leg of *Callinicus pollenius* (Cole), T = tibia.

- 1. Abdominal segments 3–7 of male and 4–6 of female red, silver fasciae covering entire dorsum of male segments 5–6 *abdominalis* Williston
- All abdominal segments of male and female black; silver fasciae of male covering entire dorsum of segment 6 and basal portion of segment 5 *utahensis* Banks

Key to the Species of Utah *Ospriocerus* Loew
(Modified from Martin 1968)

- 1. Abdominal segments entirely black *minos* Osten Sacken
- Abdominal segments in part reddish, or brown pollinose 2
- 2(1). Abdominal segments brown pollinose, tan in ground color *longulus* (Loew)
- Abdominal segments in part red, not pollinose 3
- 3(2). Tip of flagellum with notch containing small inconspicuous spine (Fig. 8) *abdominalis* (Say)
- Tip of flagellum produced as apical segment (Fig. 9) *vallensis* Martin

Key to the Species of Utah *Scleropogon* Loew
(Modified from Wilcox 1971)

- 1. Cells r_5 and m_3 with long petioles subequal to length of rm crossvein *picticornis* Loew
- Cells r_5 and m_3 either open or with one or other having a short petiole 2
- 2(1). Antennal segment 3 one and three-fourth times as long as segments 1–2; abdomen slender, gray pollinose; wings tinged with brown *duncani* (Bromley)
- Antennal segment 3 at most one and one-half times as long as segments 1–2; abdomen stockier; wings hyaline 3
- 3(2). Hypopleuron with bristles, cell m_3 closed and usually short petiolate 4
- Hypopleuron with hairs, cell m_3 broadly open 5
- 4(3). Abdomen stout, apex of wings reaching to tergite 6; ground color of most of abdomen tan; length 15–19 mm *coyote* (Bromley)
- Abdomen elongate, apex of wings not reaching to tergite 6 but covering base of tergite 5; ground color of abdomen dark brown with bases and apices of segments tan; length 19–26 mm *indistinctus* (Bromley)
- 5(3). Abdomen black, narrow posterior and lateral margins of tergites tan; densely pollinose *neglectus* (Bromley)
- Abdomen reddish brown, black laterally on basal segments; thinly pollinose *bradleyi* (Bromley)

Key to the Species of Utah *Stenopogon* Loew
(Modified from Wilcox 1971)

- 1. Gibbosity of face extending about one-half to three-fourths distance from oral margin to antennae (Fig. 3); fore coxae with numerous bristles 2
- Gibbosity extending about five-sixths to seven-eighths distance from oral margin to antennae (Fig. 2); fore coxae with numerous long hairs 3
- 2(1). Gibbosity weak, face not strongly inflated; shiny black triangle between mystax and antennae absent; small, length 9–10 mm . . . *utahensis* Bromley
- Gibbosity strong, face strongly inflated; shiny black triangle between mystax present; large, length 20–37 mm *inquinatus* Loew
- 3(1). Abdomen densely pollinose; long hairs on inner arms of hypandrium continuing across base *martini* Bromley
- Abdomen subshining black; long hairs on inner arms of hypandrium interrupted medially 4
- 4(3). Hind tibiae with indistinct reddish area at least near apex; mystax yellowish *engelhardti* Bromley³
- Hind tibiae all reddish or yellowish, mystax reddish *rufibarbis* Bromley³

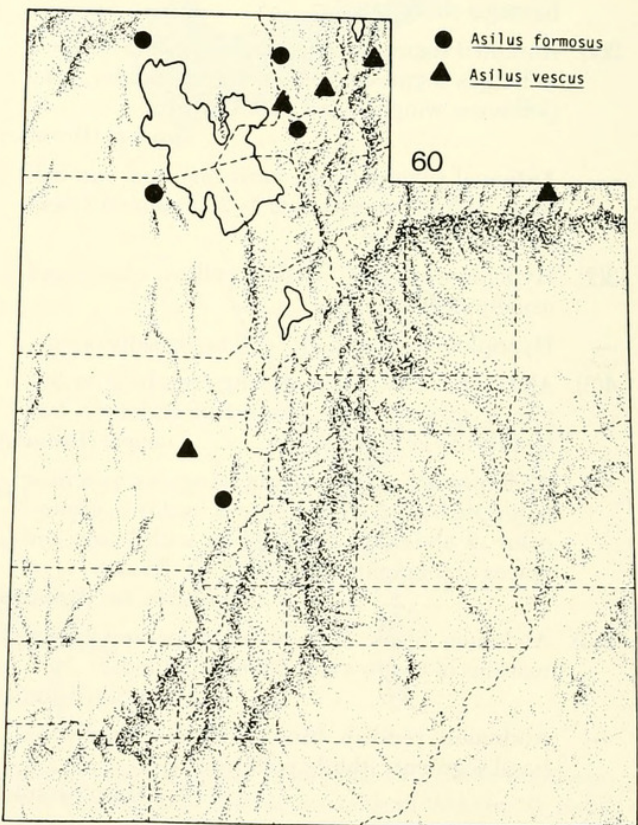
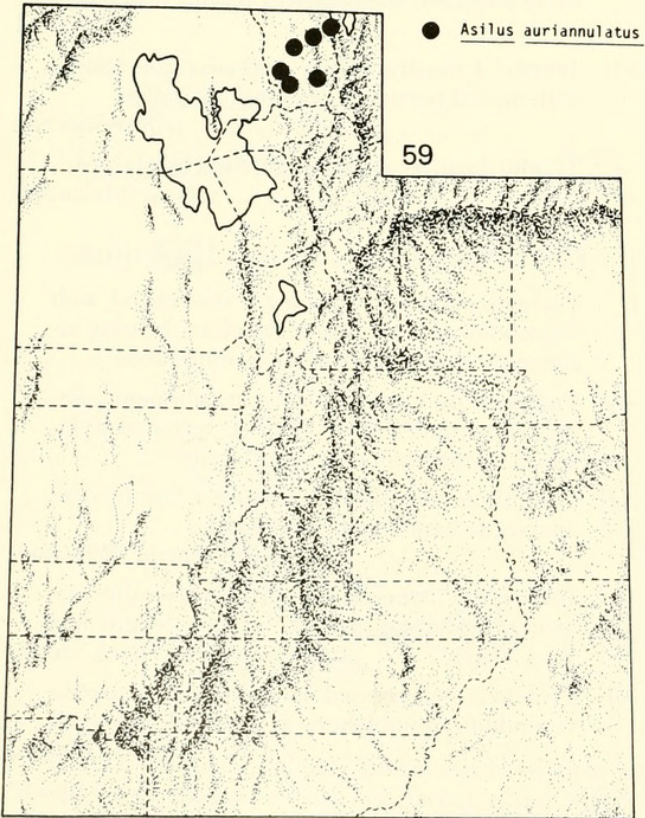
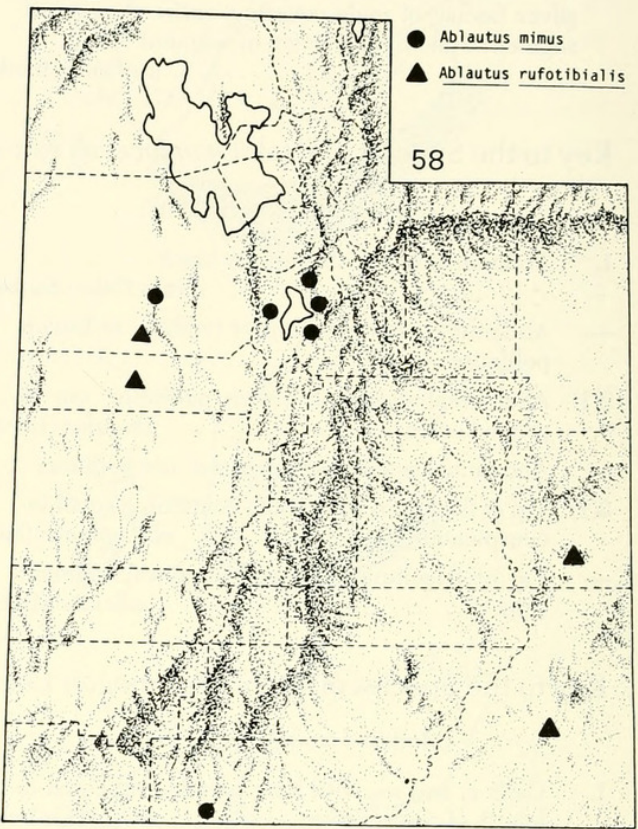
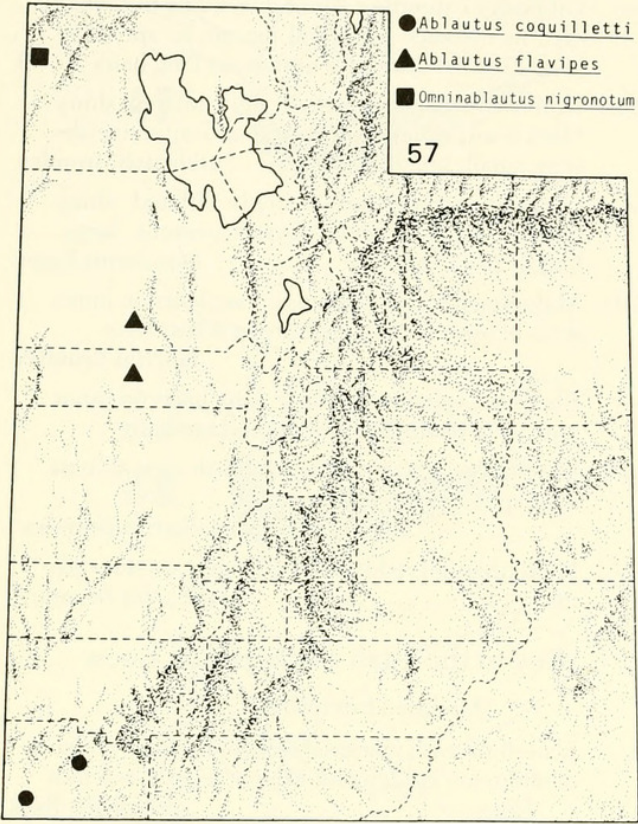
Key to the Utah *Stichopogon* Loew
(Modified from Wilcox 1936b)

- 1. Scutellum with marginal hairs or bristles; pollen of abdomen golden and brown; length 3–5 mm *fragilis* Back
- Scutellum lacking marginal hairs or bristles; pollen of abdomen silver; length greater than 6 mm 2
- 2(1). Tergite 4 mostly silvery pollinose sometimes with medial portion of apex lacking pollen *trifasciatus* Say
- Tergite 4 with black band covering basal third *salinus* (Melander)

Key to the Genera of Utah Laphriinae

- 1. Postmetacoxal area forming a sclerotized arch when viewed from below; flagellum bearing either a short dorsal bristle or terminal style 2
- Postmetacoxal area entirely membranous; flagellum without dorsal bristle or terminal style, apical pit may contain a short bristle 3
- 2(1). Coloration and pile resembling a bumblebee; anatergite bare; length over 25 mm *Dasylechia atrox* (Williston)
- Body quite bare, not resembling a bumblebee; anatergite haired or with bristles; length less than 20 mm *Atomosia mucida* Osten Sacken
- 3(1). Proboscis compressed laterally; some species resembling bumblebees in pile and coloration *Laphria* Meigen

³Wilcox has determined specimens as being either *S. engelhardti* or *S. rufibarbis* from the same localities which do not agree with the final couplet of this key. It may be that the characters used in this key (adapted from Wilcox 1971) are not dependable in separating Utah specimens of these two species.



Figs. 57–60. Utah Asilidae, distribution: 57, *Ablautus coquilletti*, *Ablautus flavipes*, and *Ominabla nigrum*; 58, *Ablautus mimus* and *Ablautus rufotibialis*; 59, *Asilus auriannulatus*; 60, *Asilus formosus* and *Asilus vesus*.

- Proboscis flattened dorsoventrally; abdomen mostly bare and reddish orange *Cerotainiops abdominalis* (Brown)

Key to the Genera and Species of Utah Asilinae

(Modified from Wood 1981)

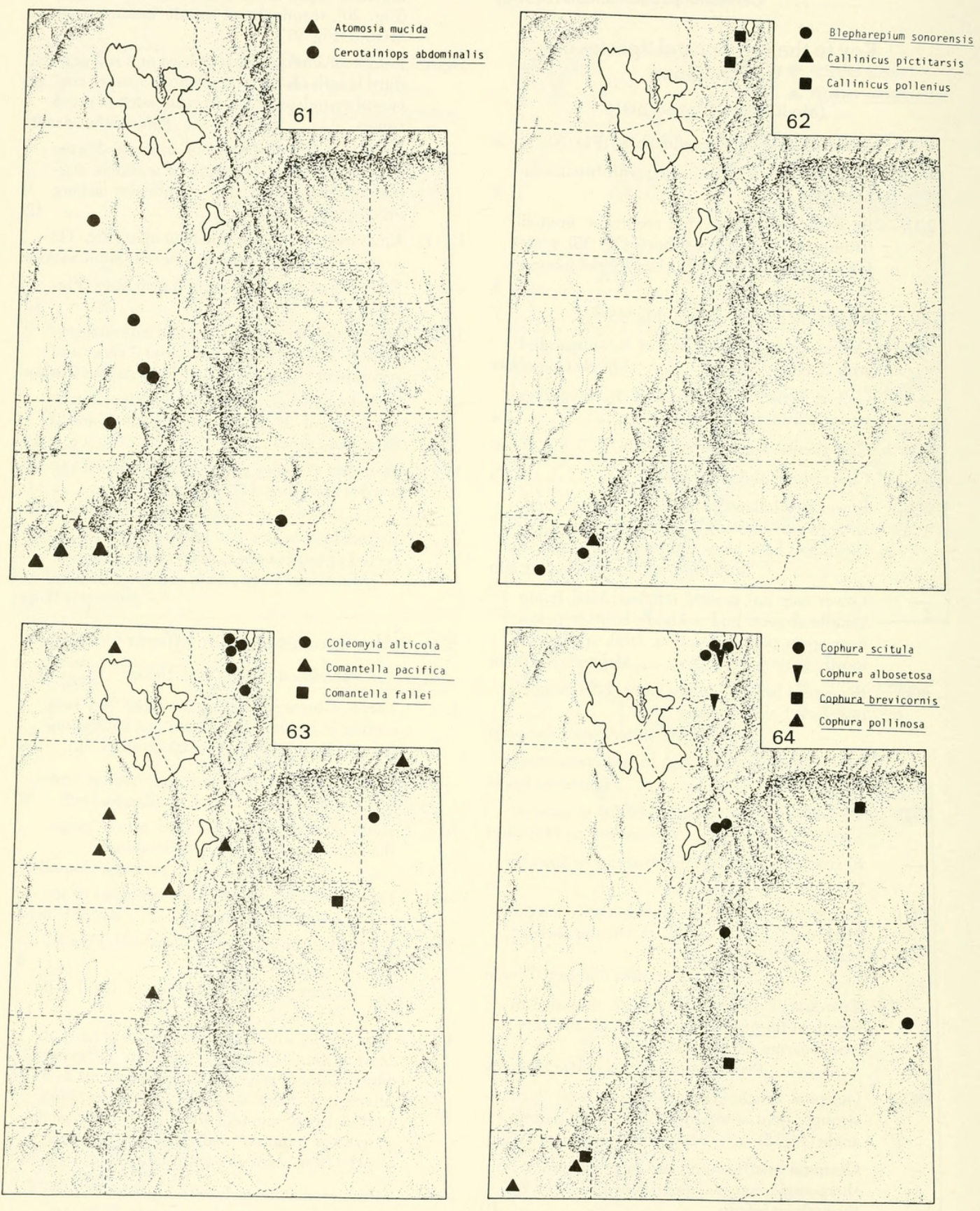
- 1. Anatergite (metanotal callus) bare (Fig. 33) . . 2
- Anatergite (metanotal callus) with bristles or hairs (Fig. 32) 9
- 2(1). R_4 with recurrent vein; recurrent branch (stump vein) sometimes short (Fig. 35), ending in cell r_{2+3} or extending basally and joining R_{2+3} (Fig. 42) 3
- R_4 without recurrent vein (Fig. 43) 7
- 3(2). Cell r_4 narrow, apical half of R_5 subparallel with R_4 (Figs. 35–39) *Efferia* Coquillett
- Cell r_4 broad, apical half of R_5 diverging strongly from R_4 (Fig. 42) 4
- 4(3). Claws acute; abdomen elongate 6
- Claws blunt; abdomen stout 5
- 5(4). Lower face inflated; hind femur club-shaped, with row of bristles below near apex; Utah specimens have black pile on thorax *Mallophora fautrix* Osten Sacken
- Lower face not greatly inflated; hind femur spindle-shaped and without bristles below near apex; pile of thorax in Utah specimens mostly gray and/or yellow . . . *Megaphorus* Bigot
- 6(4). Recurrent branch (stump vein) short (similar to *Efferia*), not reaching R_{2+3} *Triorla interrupta* Macquart
- Recurrent vein extending to and connecting with R_{2+3} *Promachus* Loew
- 7(2). R_5 reaching wing margin anterior to apex of wing *Proctacanthus* Macquart
- R_5 reaching wing margin posterior to apex of wing 8
- 8(7). Epandria of male black and elongate, longer than tergite 6; terminalia of females lacking strong bristles *Regasilus blantoni* Curran
- Epandria of male red and short, subequal to length of tergite 6 (Fig. 22); terminalia of female bearing strong bristles (Fig. 23) *Proctacanthella cacopiloga* Bromley
- 9(1). Occipital bristles long and fine, distal third strongly bent anteriad at nearly a 90 degree angle (Fig. 5) . . . *Neoitamus brevicornis* (Hine)
- Occipital bristles stout, not bent forward at a sharp angle, but may bend forward gradually throughout length 10
- 10(9). Epandria of male arching to enclose an open space when viewed from above (Fig. 18); terminalia of female bearing several pairs of stout bristles (Fig. 19) *Philonicus* Loew

- Epandria of male not arching to enclose an open space when viewed from above, but touching along most of dorsomedial margin (Fig. 20); terminalia of female lacking stout bristles (Fig. 21) 11
- 11(10). Length of antennal style at least one and one-third length of antennal segment 3; inner surface of epandrium of male with patch of erect spines *Polacantha* Martin
- Length of antennal style of antenna shorter than or subequal to length of antennal segment 3; inner surface of epandrium lacking erect spines 12
- 12(11). Epandria of male notched near apex (Fig. 11) *Neomochtherus* Osten Sacken
- Epandria of male not notched near apex (Fig. 24) 13
- 13(12). Style about one-fourth length of antennal segment 3; bristles of tergites 2 and 3 short and recumbent *Negasilus* Curran
- Style longer than one-fourth length of antennal segment 3; bristles of tergites 2 and 3 longer and erect 14
- 14(13). Epandria of males pointed and directed upward at apex (Fig. 17), apices diverging *Asilus auriannulatus* Hine
- Epandria of males not pointed and not directed upward at apex, apices converging *Machimus* Loew, *Asilus vescus* Hine, and *A. formosus* Hine

Key to the Species of Utah Efferia Coquillett

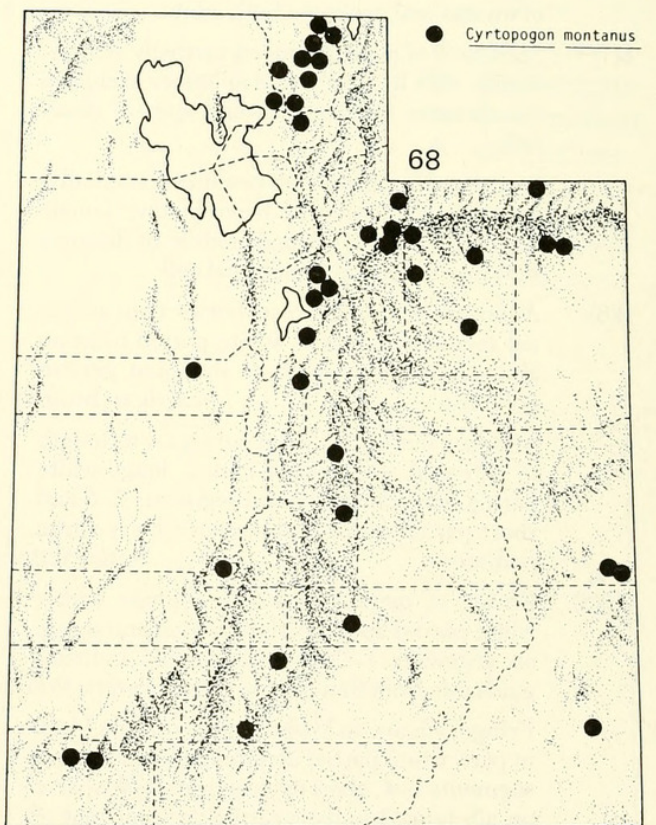
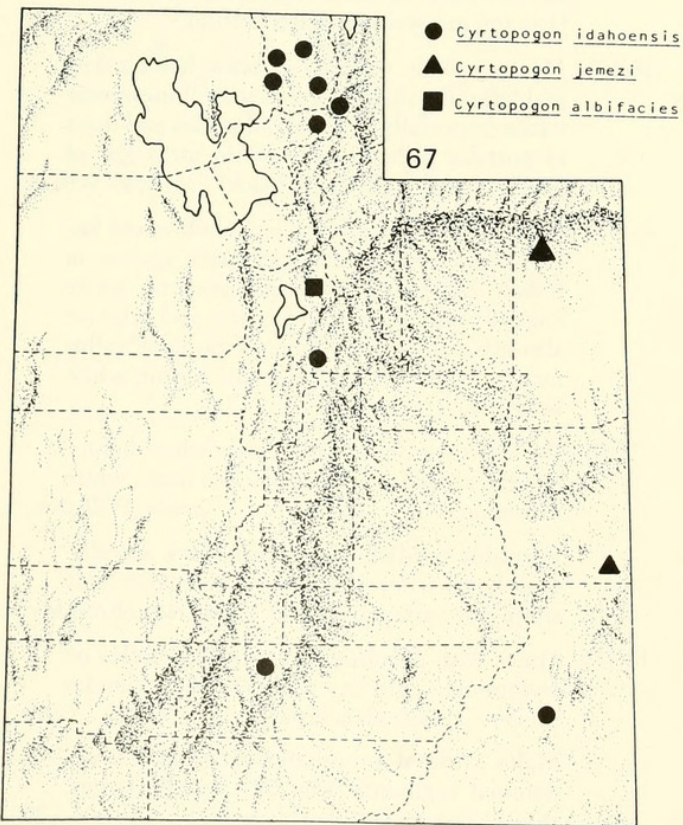
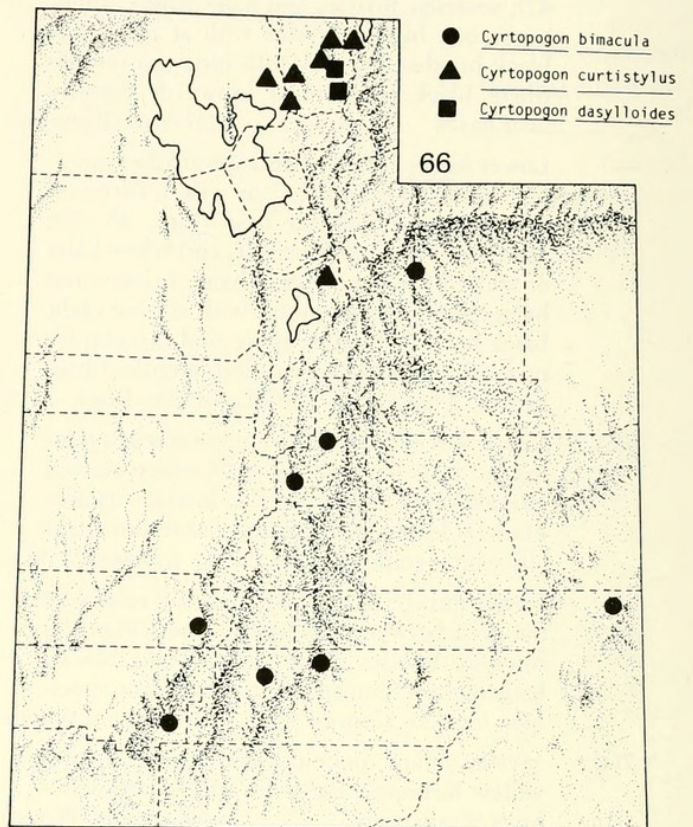
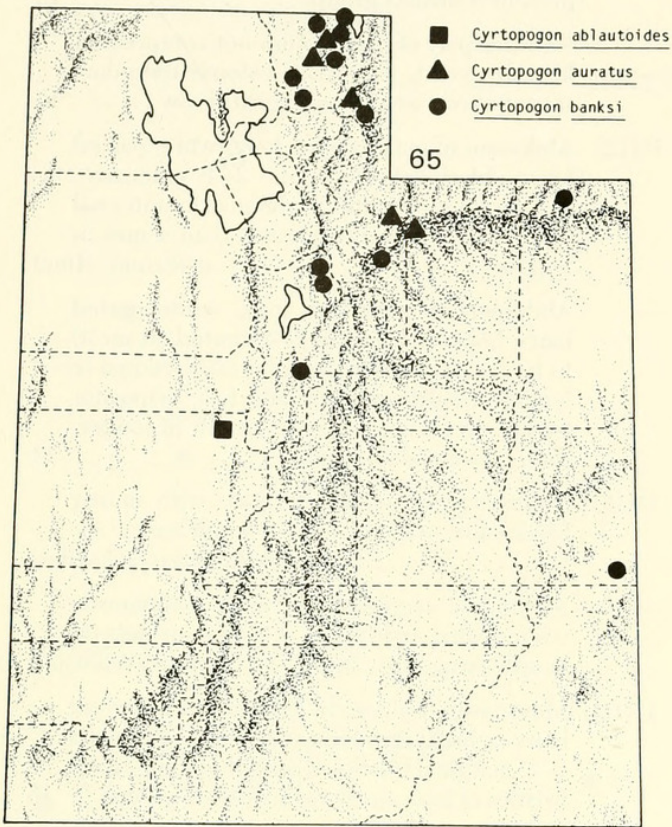
(Modified from Wilcox 1966a)

- 1. Three submarginal cells in wings (no vein ending in a submarginal cell, but continuing to meet R_2), (Fig. 39)(Anomala group) 2
- Two submarginal cells in wings, 'stump' vein present and ending in first submarginal cell . . 3
- 2(1). Hairs on abdominal sternites much longer than antennal segments 1–2 combined *pernicus* Coquillett
- Hairs on abdominal sternites subequal to antennal segment 1 in length *davisi* Wilcox
- 3(1). R_{4+5} forking before apex of discal cell (Figs 37, 44) 4
- R_{4+5} forking at or beyond apex of discal cell (Figs. 34–36, 38, 41) 11
- 4(3). Mesonotum anteriorly with bristles or hairs at least as long as antennal segments 1–2 combined; color of male abdominal segments 2–5 alternating black and white; lacking long parted hairs; segment 6–7 white pollinose; ovipositor pointed and split at tip when viewed from above (Pogonias group) 5
- Mesonotum anteriorly with bristles and hairs shorter than antennal segments 1–2 combined; color of male abdominal segments gray or white pollinose, often with white parted hairs; ovipositor rounded at tip, not split when viewed from above (Staminea group) . . 7



Figs. 61–64. Utah Asilidae, distribution: 61, *Atomsia mucida* and *Cerotainiops abdominalis*; 62, *Blepharepium sonorensis*, *Callinicus pictitarsis*, and *Callinicus pollenius*; 63, *Coleomyia alticola*, *Comantella pacifica*, and *Comantella falli*; 64, *Cophura scitula*, *Cophura albosetosa*, *Cophura brevicornis*, and *Cophura pollinosa*.

5(4).	Lower forceps of male with apical lobes forming an acute angle when viewed laterally (Fig. 47); scutellar bristles and hairs white (sometimes one black); mystax with at most four black bristles; females with fore and middle tibiae black, sometimes brownish dorsally near bases <i>utahensis</i> (Bromley)	12(11).	Anterior part of mesonotum compressed laterally; acrostical crest of long hairs or bristles present (Carinata group) 13
—	Lower forceps of male with apical lobes meeting basally as a broad U or with a flattened area between them at base (Figs. 48–49); scutellum with black bristles and white hairs or white bristles and black hairs, bristles and hairs not all white; mystax with at least eight black hairs or bristles along oral margin; females usually with fore and middle tibiae brown, if black then scutellar bristles black . . 6	—	Anterior part of mesonotum not compressed laterally; crest, if present, extends onto dorsocentral row as well as acrostical row 15
6(5).	Lower forceps of male with apical lobes joining in a broad, evenly curved U when viewed laterally (Fig. 48); scutellar bristles usually black (at least in part), hairs of scutellum usually white; common <i>frewingi</i> Wilcox	13(12).	Abdomen of male lacking long, white parted hairs; black of segments 2–4 extensive; mesonotal crest short, subequal to antennal segment 1; ovipositor greater than 4 mm in length <i>willistoni</i> (Hine)
—	Lower forceps of male with a broad relatively flat area between the apical lobes (Fig. 49); scutellar bristles white (at most one black), hairs of scutellum all black; rare, single specimen from St. George <i>mortensoni</i> Wilcox	—	Abdomen of male with long, white parted hairs; black of segment 2–4 limited (at most) to hind margins; mesonotal crest subequal to length of antennal segments 1–3; ovipositor usually less than 4 mm in length (if longer, then mesonotal crest long) 14
7(4).	Mystax yellow, pollen of face yellow (slightly yellow in female but contrasting with white hairs of postgena) <i>staminea</i> (Williston)	14(13).	Abdominal segment 7 of male with mostly black hairs; ovipositor about 4 mm long <i>subcuprea</i> (Schaeffer)
—	Mystax and pollen of face silvery white, hairs of mystax and postgena both white 8	—	Abdominal segment 7 of male with mostly white hairs; ovipositor 3.5 mm or less in length (wing, Fig. 38) <i>costalis</i> (Williston)
8(7).	Sternite 8 of male produced medially at apex; female with R ₄₊₅ forking at or before middle of the distance between rm and apex of discal cell 9	15(12).	Mesonotum anteriorly with numerous erect hairs or bristles as long as antennal segments 1–3; marginal bristles of scutellum numerous; bristles of tarsi mostly white (Arida group) . . 16
—	Sternite 8 of male not produced medially, straight when viewed from below; female with R ₄₊₅ forking beyond middle of distance between rm and apex of discal cell 10	—	Mesonotum anteriorly with bristles and hairs shorter than antennal segments 1–2; fewer than ten marginal scutellar bristles 18
9(8).	Anterior mesonotal crest shorter than antennal segment 1; sparse, white parted hairs on abdominal segments 2–4; abdomen grayish pollinose <i>benedicti</i> (Bromley)	16(15).	Mystax mostly white, 1–8 black hairs below and laterally; discal hairs of scutellum mostly white (especially in female); bristles and hairs of postalar callus mostly white (or a few of weaker bristles and hairs black) . <i>apache</i> Wilcox
—	Anterior mesonotal crest subequal to length of antennal segments 1 and 2; long, white parted hairs on abdominal segments 2–5 and short parted on 6–7; abdomen silvery-white pollinose <i>basini</i> Wilcox	—	Mystax with dense black hairs below and laterally in male, lateral black hairs sparser in female but more than eight present; white hairs of scutellum limited to base and sides (or absent); bristles and hairs of postalar callus mostly black (with at least one strong white bristle) 17
10(8).	Fringe of hairs on surstyli of male white; white parted abdominal hairs long and dense on segments 1–7 of male; female indistinguishable from that of <i>cana</i> <i>deserti</i> Wilcox	17(16).	Foretibia mostly black, somewhat lighter basally; scutellar bristles black in male, white in female <i>arida</i> (Williston)
—	Fringe of hairs on lower forceps of male black in part; white parted abdominal hairs long on segments 1–4, short on segments 5–7, sparse on all; female indistinguishable from that of <i>deserti</i> <i>cana</i> (Hine)	—	Foretibia reddish basally and black apically; scutellar bristles white (only male seen; may simply be variant of <i>arida</i>) . <i>subarida</i> (Bromley)
11(3).	R ₅ reaching costa before apex of wing (Figs. 35–38, 41) 12	18(15).	Males with prominent, ventral tubercles on abdominal segments 4–7 (Fig. 50), slender species (Tuberculata group) 19
—	R ₅ reaching costa after apex of wing (Fig. 34) <i>aestuans</i> (Linnaeus)	—	Males without prominent tubercles on abdominal segments (Fig. 52); usually larger, stouter species (Albibarbis group) 20
		19(18).	Male terminalia and tubercles reddish; female abdominal segment 7 and base of ovipositor reddish; abdominal tergites largely white haired, some hairs of tergite 7 black <i>tucsoni</i> Wilcox



Figs. 65–68. Utah Asilidae, distribution: 65, *Cyrtopogon ablautooides*, *Cyrtopogon auratus*, and *Cyrtopogon banksi*; 66, *Cyrtopogon bimacula*, *Cyrtopogon curtistylus*, and *Cyrtopogon dasylloides*; 67, *Cyrtopogon idahoensis*, *Cyrtopogon jemezi*, and *Cyrtopogon albifacies*; 68, *Cyrtopogon montanus*.

- Male terminalia and tubercles black; female abdominal segment 7 and base of ovipositor black; abdominal tergites broadly black haired *producta* (Hine)
- 20(18). Male terminalia black; surstyli with ventral tooth near apex (Fig. 51); marginal scutellar bristles black with discal hairs long and white *bicolor* Bellardi
- Male terminalia reddish; surstyli without ventral tooth near apex (Figs. 52, 53); scutellum with either black bristles and some short black hairs or with bristles and hairs both white 21
- 21(20). Mystax all white; transverse black (or brownish) bands of abdomen interrupted by longitudinal lighter stripe; length of ovipositor subequal to length of abdominal segments 6–7; male genitalia as in Fig. 52 *albibarbis* (Macquart)
- Mystax black and white; transverse black bands of abdomen uninterrupted; length of ovipositor greater than length of abdominal segments 6–7; male genitalia as in Fig. 53 *zonata* (Hine)

Key to the Species of Utah *Machimus* Loew
Including *Asilus formosus* Hine and
Asilus vescus Hine

(Modified from Hine 1909 and Martin 1975)

- 1. Hind femur longitudinally yellowish brown on ventral surface and black on dorsal surface 2
- Hind femur with yellowish brown confined to apex, or hind femora entirely black 4
- 2(1). Wing with some dark coloration; especially near apex 3
- Wing entirely hyaline *Asilus formosus* Hine
- 3(2). Wing with dark spots in medial cells; distal fourth of wing with dark coloration isolated from veins except at extreme tips; proctiger without ventral process near apex *griseus* (Hine)
- Wing without dark spots in medial cells, distal fourth of wing with faint dark wash reaching veins before apex; proctiger with ventral process near apex (Fig. 25) *adustus* Martin
- 4(1). Sternite 8 of male produced apically and bearing tuft of longer hairs on apex of produced area (Fig. 6) 5
- Sternite 8 of male not produced apically, hairs of uniform length across posterior margin (Fig. 7) . 6
- 5(4). Proctiger with two processes near its attachment to abdomen; medial areas of tergites covered with brown pollen *sestertius* Martin
- Proctiger lacking processes; medial areas of tergites covered with dense, silvery pollen *occidentalis* (Hine)
- 6(4). Small, less than 11 mm in total length; male terminalia reddish brown *Asilus vescus* Hine

- Larger, greater than 12 mm in total length; male terminalia black or dark brown 7
- 7(6). Pollen of abdomen golden; color of incisures not contrasting greatly with color of remainder of each segment *paropus* (Walker)
- Pollen of abdomen silvery; incisures yellowish, contrasting with the black remainder of each segment *callidus* (Williston)

Key to the Species of Utah *Megaphorus* Bigot

(Modified from Cole and Pritchard 1964)

- 1. Costa ending near wing tip 2
- Costa continuing around wing tip to hind margin 4
- 2(1). Cell r₅ open *pulcher* (Pritchard)
- Cell r₅ closed, usually petiolate 3
- 3(2). Wing veins brown *willistoni* (Cole)⁴
- Wing veins yellow *guildiana* (Williston)⁴
- 4(1). Pile of thorax and abdomen white, wings yellowish; length 10 mm *pallidus* (Johnson)
- Pile of thorax and abdomen bright yellow, wings brownish; length 12–14 mm .. *frustra* (Pritchard)

Key to the Species of Utah *Negasilus* Curran

- 1. Margin of scutellum with bristles ... *mesae* (Tucker)
- Margin of scutellum lacking bristles ... *belli* Curran

Key to the Species of Utah
Neomochtherus Osten Sacken

- 1. Face white, disc of scutellum lacking long, white hairs *hypopygialis* (Shaeffer)
- Face brown; disc of scutellum with long, white hairs 2
- 2(1). Wings of male with brown color concentrated in area near middle of anterior half of wing; anal lobe of male hyaline *lepidus* (Hine)
- Wings of male with brown color evenly distributed throughout; anal lobe of male tinged with brown *albicornis* (Hine)

Key to the Species of Utah *Philonicus* Loew

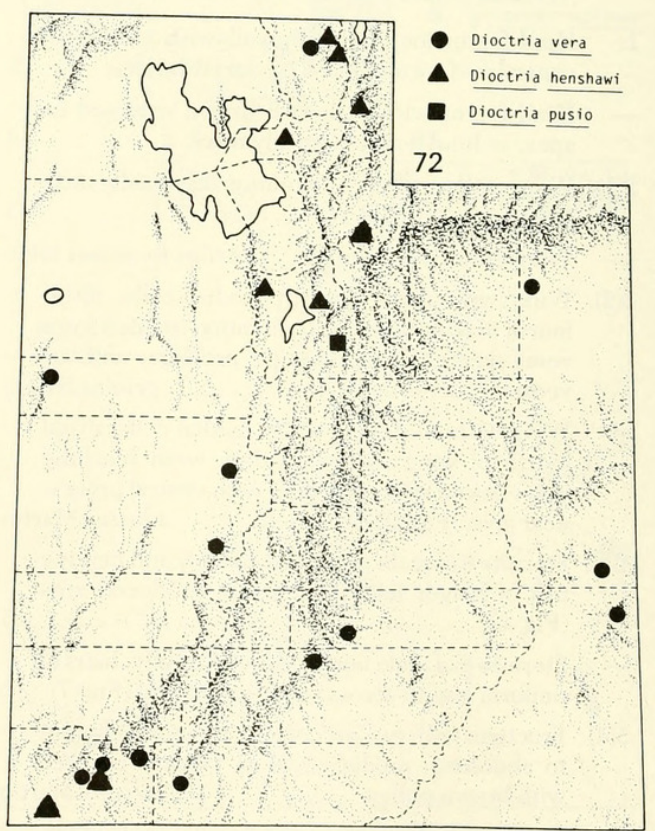
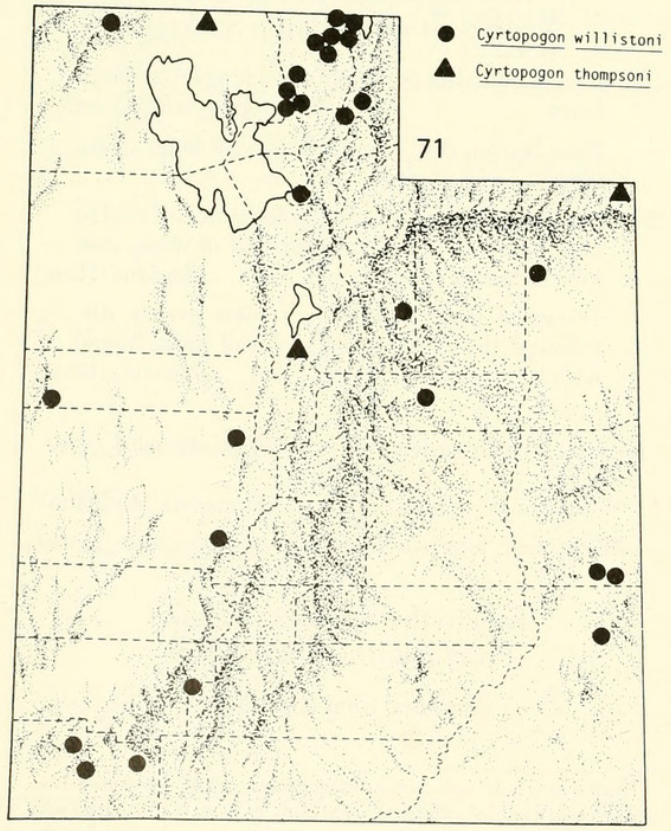
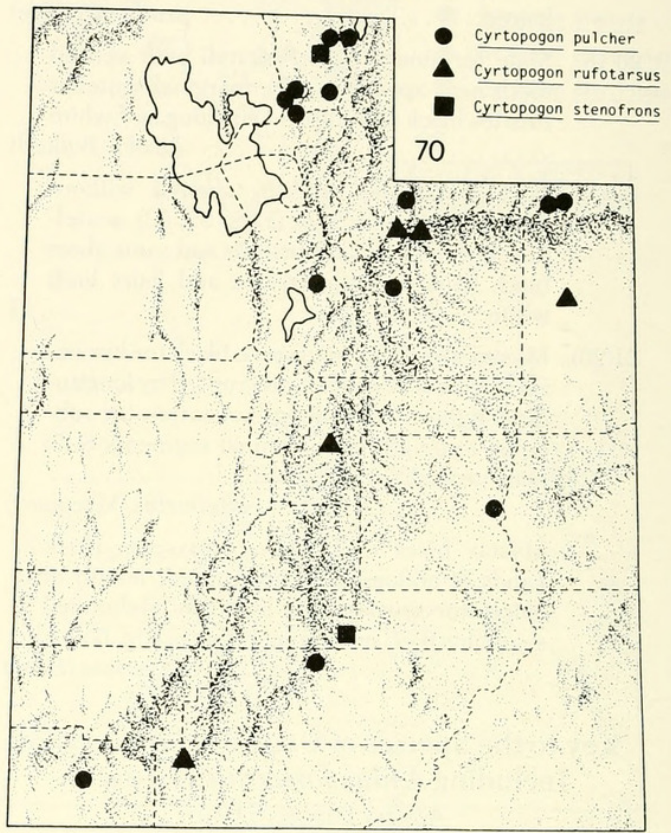
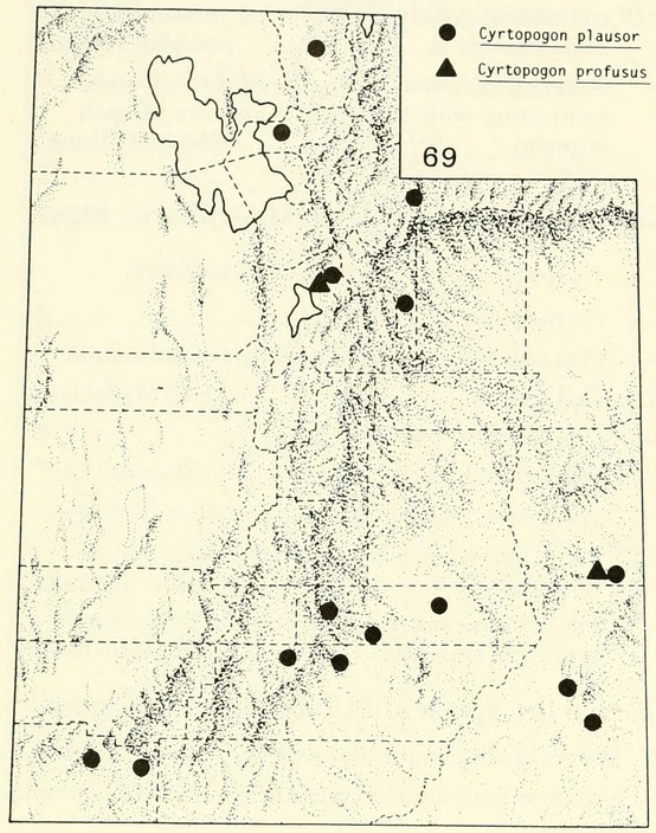
- 1. Wing smoky; legs dark red .. *arizonensis* (Williston)⁵
- Wing clear; legs pale reddish . *limpidipennis* (Hine)⁵

Key to the Species of Utah
Proctacanthus Macquart

(Modified from Hine 1911)

⁴With regard to *M. willistoni* and *M. guildiana*, Cole and Pritchard state, "Some populations [of *willistoni*], particularly in Utah, tend to blend with *guildiana*." After examining the specimens of these species found in the state, I found the key lead most comfortably to *willistoni*.

⁵Specimens of both species have been identified by Bromley and Wilcox as occurring scattered throughout the state. Using the above key derived from Hine (1909) and Bromley (1934), I found that specimens from Utah seem to run best to *arizonensis*.



Figs. 69–72. Utah Asilidae, distribution: 69, *Cyrtopogon plausor* and *Cyrtopogon profusus*; 70, *Cyrtopogon pulcher*, *Cyrtopogon rufotarsus*, and *Cyrtopogon stenofrons*; 71, *Cyrtopogon willistoni* and *Cyrtopogon thompsoni*; 72, *Dioctria vera*, *Dioctria henshawi*, and *Dioctria pusio*.

- 1. Body with ground color reddish orange *hinei* Bromley
- Body with ground color black and orange 2
- 2. Wings with uniform brownish tinge⁶ *milberti* Macquart
- Wings clear or with brown concentrated near veins 3
- 3(2). Epandria of male genitalia curving outward and then back to enclose a space between tips and proctiger when viewed from above (Fig. 26); terminal keellike sternite of female lacking strong spines ventrally (Fig. 27); circlet of spines present dorsally *nearno* Martin
- Epandria not enclosing a space, but straight and compact against proctiger (Fig. 28); terminalia of female with ventral keellike projection covered with stout spines in addition to dorsal circlet of spines (Fig. 29) *micans* Schiner

Key to the Species of Utah *Promachus* Loew
(Modified from Hine 1911)

- 1. First submarginal cell with dark, distinct gray cloud 2
- First submarginal cell clear or with very faint, narrow gray line; black areas of abdomen with few to many white hairs near lateral and posterior margins of segments *aldrichii* Hine
- 2(1). Male genitalia without silvery hairs above; tibiae yellow in contrast to black femora .. *sackeni* Hine
- Male genitalia with silvery hairs above; tibiae and femora more or less concolorous, not contrasting greatly 3
- 3(2). Mystax white, sometimes slightly yellow; thorax gray pollinose; male abdominal tergite 3 without lateral patch of dense black hairs; light hairs of abdomen whitish gray *albifacies* Williston
- Mystax yellowish; thorax brownish yellow pollinose; male abdominal tergite 3 with lateral patch of dense black hairs; light hairs of abdomen yellowish *dimidiatus* Hine

SYNOPSIS OF SPECIES

Subfamily Dasypogoninae

Ablautus coquillettii Wilcox 1935: 226 [Holotype: male, Los Angeles Co., California in USNM]. Utah distribution: Washington Co.: Leeds Cyn., Santa Clara. 4 May–2 June.

⁶Authors including M. T. James, J. Wilcox, and S. W. Bromley have identified these three species as occurring in Utah. I have difficulty, however, in seeing a distinct brownish tinge of the wings of *P. milberti*, making the male specimens determined by these people run to *P. micans* in Hine's key (1911). Females labelled *P. milberti* lack the spines on the terminal keellike sternites. The dorsal circlet of spines of *P. milberti* is composed of several rows (2–4) of spines, while those of *P. micans* and *P. nearno* are reduced to a single row of stouter spines. These observations were made without examining types but by comparing specimens in the USU collection which had previously been identified by the above authors.

Ablautus flavipes Coquillett 1904: 178 [Types: Three males and two females, Los Angeles and San Diego counties, California in USNM]. Utah distribution: Juab Co.: Topaz Mtn.; Tooele Co.: Dugway Proving Ground. 26 April–20 June.

Ablautus mimus Osten Sacken 1877: 290 [Holotype: male, Crafton near San Bernardino, California, March in MCZ]. Utah distribution: Carbon Co.: Woodhill; Emery Co.: Elmo; Kane Co.: Kanab; Tooele Co.: Cedar Mtns.; Utah Co.: Alpine, Provo, Spanish Fork, Vineyard (now Geneva Steel), west side Utah Lake. 6 April–4 July.

Ablautus rufotibialis Back 1909: 182 [Holotype: female, Ysleta, Texas, 2 April 1902 in AESP]. Utah distribution: Grand Co.: Moab; Juab Co.: Topaz Mtn.; San Juan Co.: Comb Wash 32 mi SW Blanding; Tooele Co.: Dugway Proving Ground. 17–22 April.

Blepharepium sonorensis Papavero and Bernardi 1973: 175 [Holotype: Arizona, Palos Verdes, viii. 1949, in Museu Zoologia da Universidade de Sao Paulo]. Utah distribution: Washington Co.: St. George, Coalpits Wash, Zion National Park. 5–18 August.

Bohartia sp. Utah distribution: Rich Co.: Dry Basin. 4 August.

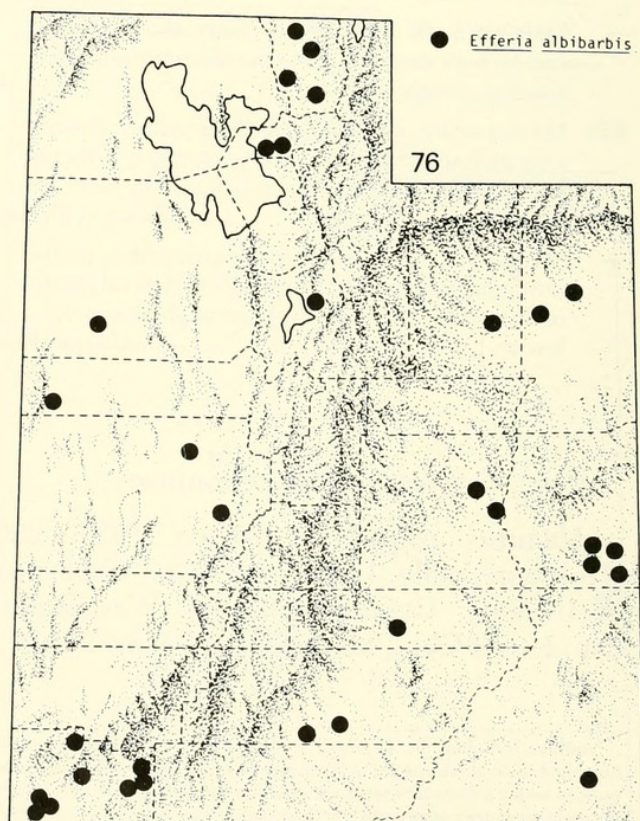
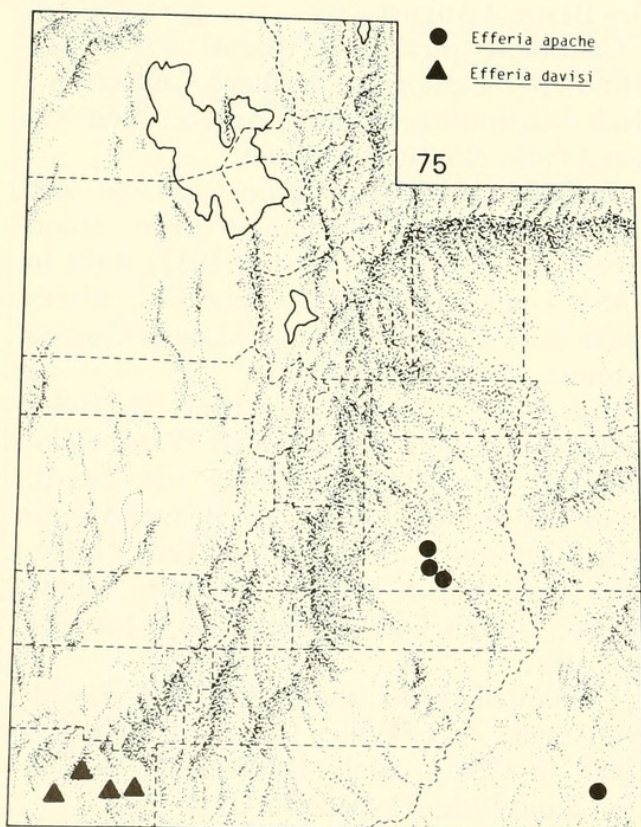
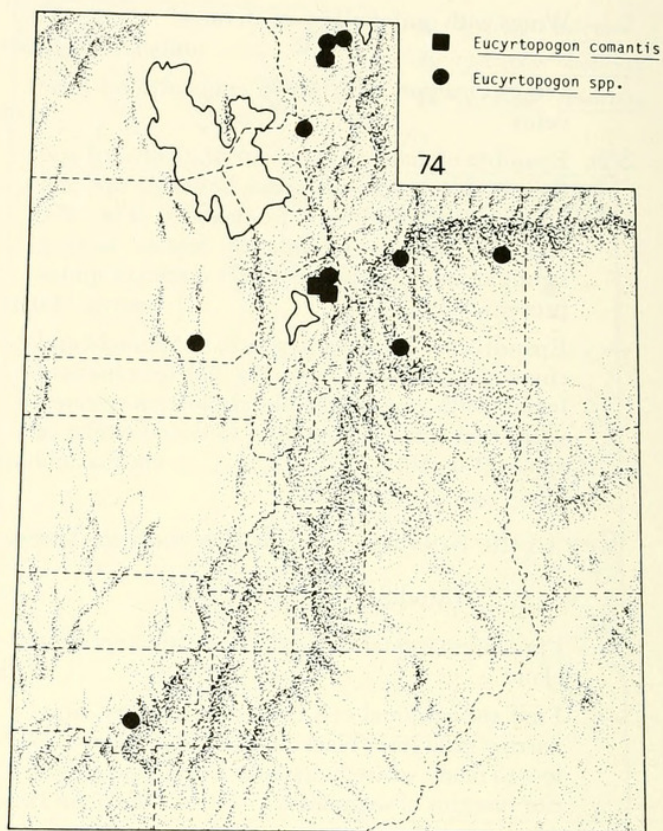
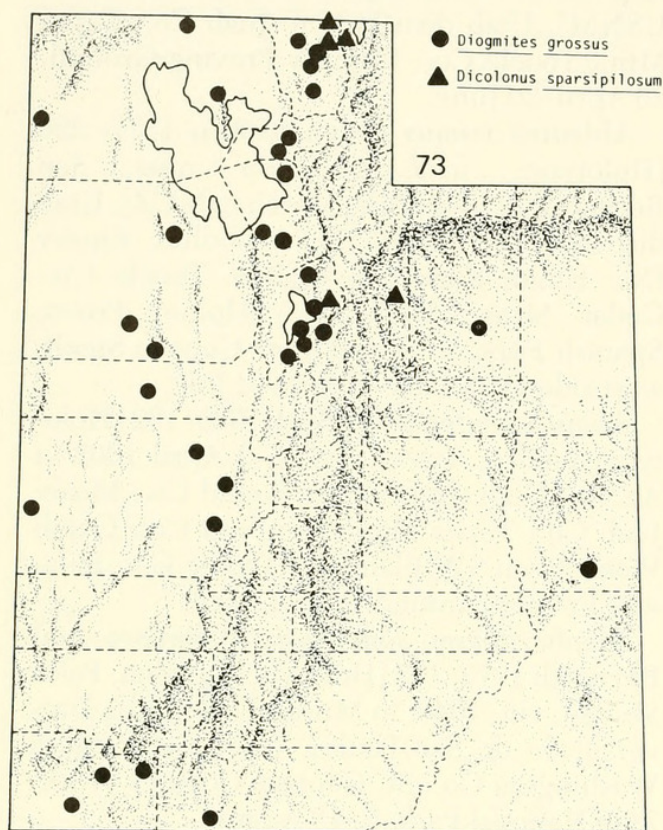
Callinicus pictitarsis (Bigot) 1878: 411 [Holotype: California; in Bigot Collection]. Utah distribution: Washington Co.: Zion National Park. No dates on labels.

Callinicus pollenius (Cole) in Cole and Lovett, 1919: 237 [Holotype: male, Hood River, Oregon, 24 September 1917; #491 in CAS]. Utah distribution: Cache Co.: Blacksmith Fork Canyon; Rich Co.: Logan Canyon summit. 30 July–1 September.

Coleomyia alticola James 1941: 37 [Holotype: male, Science Lodge near Ward, Colorado, 24 July 1939, repository not listed]. Utah distribution: Cache Co.: Beaver Mountain, Blacksmith Fork Canyon, Tony Grove; Rich Co.: Logan Canyon summit, Monte Cristo; Uintah Co.: Whiterocks. 6 June–14 August.

Comantella falliei (Back) 1909: 278 [Lectotype: male, Fort Collins, Colorado, 30 March 1900; in CSU]. Utah distribution: Carbon Co.: Sunnyside. 11–10–1936.

Comantella pacifica Curran 1926: 311 [Holotype: Penticton, B.C., 4 April 1919, #2320 in CNC]. Utah distribution: Box Elder Co.: Wildcat Hills; Carbon Co.: Price Airport;



Figs. 73–76. Utah Asilidae, distribution: 73, *Diogmites grossus* and *Dicolonus sparsipilosum*; 74, *Eucyrtopogon comantis* and *Eucyrtopogon spp.*; 75, *Efferia apache* and *Efferia davisii*; 76, *Efferia albibarbis*.

Daggett Co.: Sheep Creek; Millard Co.: Kanosh; Tooele Co.: Cedar Mountains. 26 March–4 May.

Comantella rotgeri James 1937b: 61 [Holotype: male, Stollsteimer, Colorado, 6,500 ft, 29 October 1935, no repository listed]. Utah distribution: Iron Co.: Cedar City. 26 October.

Cophura albosetosa Hine 1908: 202 [Syntypes: two males and one female, Hope Mountains, B.C.; probably in OSU]. Utah distribution: Cache Co.: Green Canyon; Weber Co.: Willard Peak. 21 July–13 August.

Cophura brevicornis Williston 1883: 22 [Syntypes: Two specimens, sex not known, from Washington, in KU]. Utah distribution: Uintah Co.: Whiterocks Canyon; Washington Co.: Zion National Park; Wayne Co.: near Grover. 12 July–7 August.

Cophura pollinosa Curran 1930: 10 [Holotype: male, Kitt Peak, Rincon, Baboquivari Mountains, Arizona, 1–4 August 1916, 4,050 ft, in AMNH]. Utah distribution: Washington Co.: Santa Clara, Zion National Park. 30 May–27 July.

Cophura scitula Williston 1883: 19 [Holotype: sex not known, Washington Territory, in KU]. Utah distribution: Cache Co.: Green Canyon, Logan, Logan Canyon, Tony Grove, West Hodges Canyon; Grand Co.: Wilson Mesa; Rich Co.: Logan Canyon summit; Sanpete Co.: Ephraim Canyon; Utah Co.: American Fork Canyon, Aspen Grove, Emerald Lake. 10 July–23 September.

Cyrtopogon ablautoides Melander 1923a: 111 [Syntypes: four males and six females, Mabton, Washington, 3 May 1911, in Melander Collection]. Utah distribution: Millard Co.: 15 mi N Delta. 31 May.

Cyrtopogon albifacies Johnson 1942: 1 [Holotype: male, Glacier Lake, Mount Timpanogos, Utah, 10,600 ft; August 1928, in BYU]. Utah distribution: Utah Co.: type locality. July–August.

Cyrtopogon auratus Cole in Cole and Lovett, 1919: 230 [Holotype: male, Mt. Rainier, Washington, White River Camp, 4 September 1932, in CAS]. Utah distribution: Cache Co.: Logan, Logan Canyon; Duchesne Co.: Mirror Lake; Rich Co.: Monte Cristo; Summit Co.: Trial Lake. 5 August–14 August.

Cyrtopogon banksi Wilcox and Martin 1936: 79 [Holotype: male, Puyallup, Washington; 3 June 1933, in CAS]. Utah distribu-

tion: Cache Co.: Avon, Blacksmith Fork Canyon, Cold Spring–Mendon, Providence, Smithfield, Tony Grove, Twin Creek, Wellsville; Daggett Co.: Ashley National Forest, Elk Park; Grand Co.: La Sal Mountains; Juab Co.: Mount Nebo; Rich Co.: Garden City, Logan Canyon summit, Monte Cristo; Utah Co.: American Fork Canyon, Aspen Grove, Mt. Timpanogos, North Fork Provo Canyon; Wasatch Co.: Wolf Creek Pass. 12 June–14 August.

Cyrtopogon bimacula (Walker) 1851: 102 [Syntypes: Four males and four females; 'North America,' in British Museum]. Utah distribution: Beaver Co.: Beaver; Duchesne Co.: Wolf Creek Pass; Garfield Co.: Boulder Mountain, Aquarius Plateau; Iron Co.: Cedar Breaks; San Juan Co.: La Sal; Sanpete Co.: Ephraim, Gunnison. 10 July–24 July.

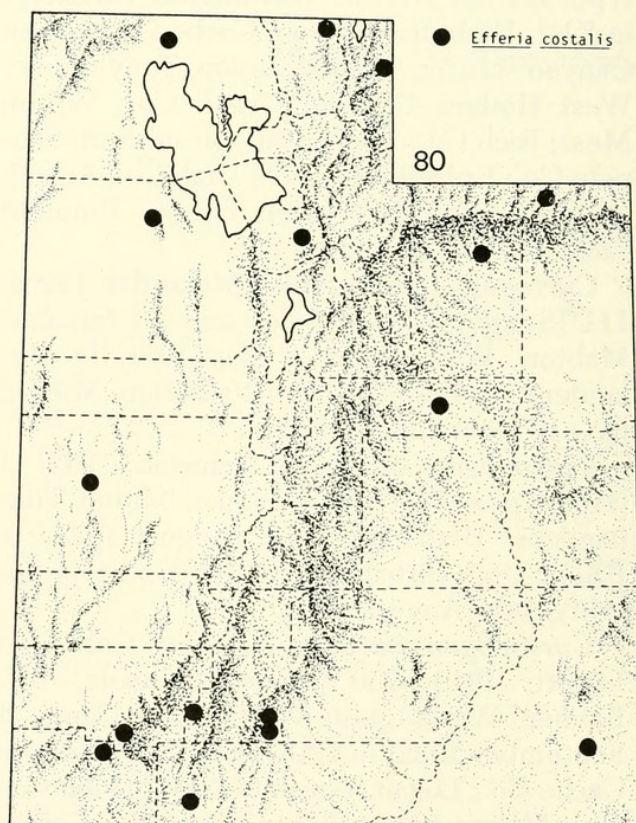
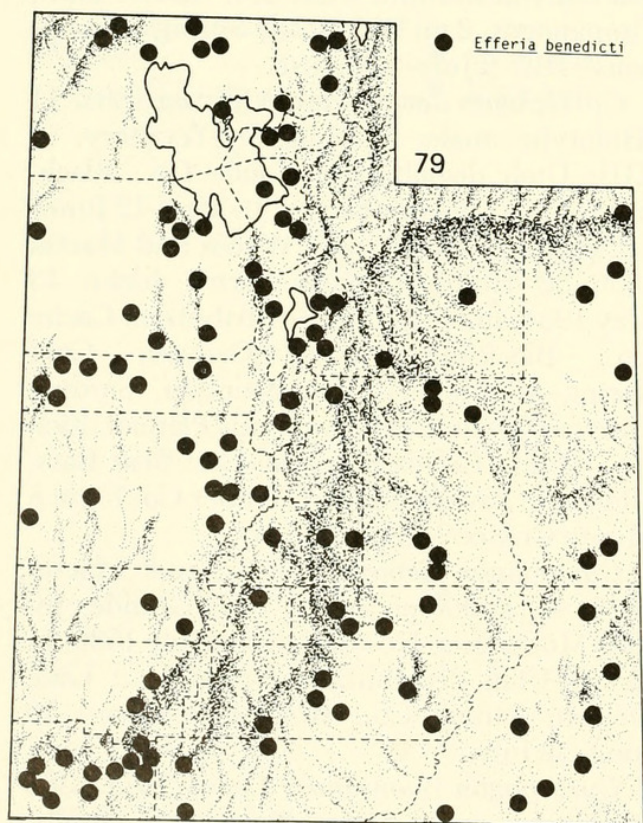
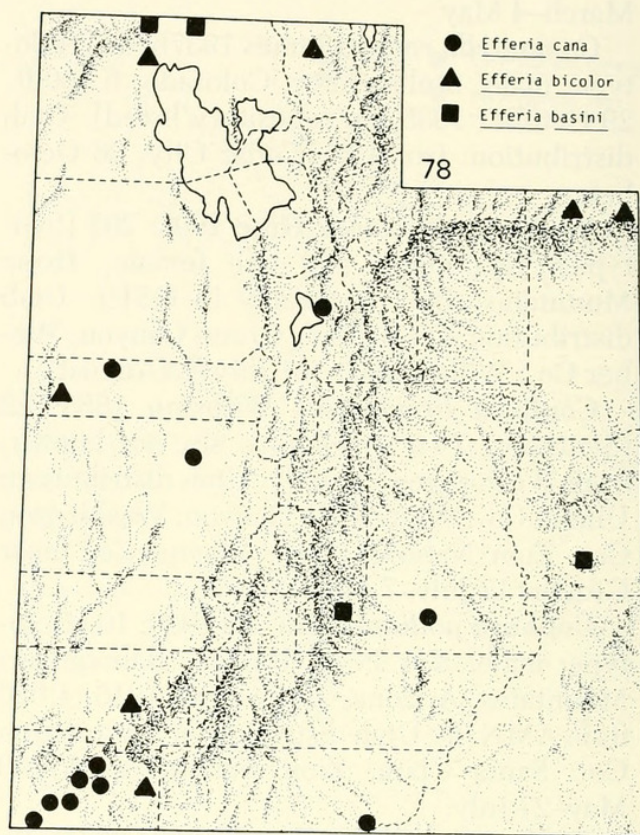
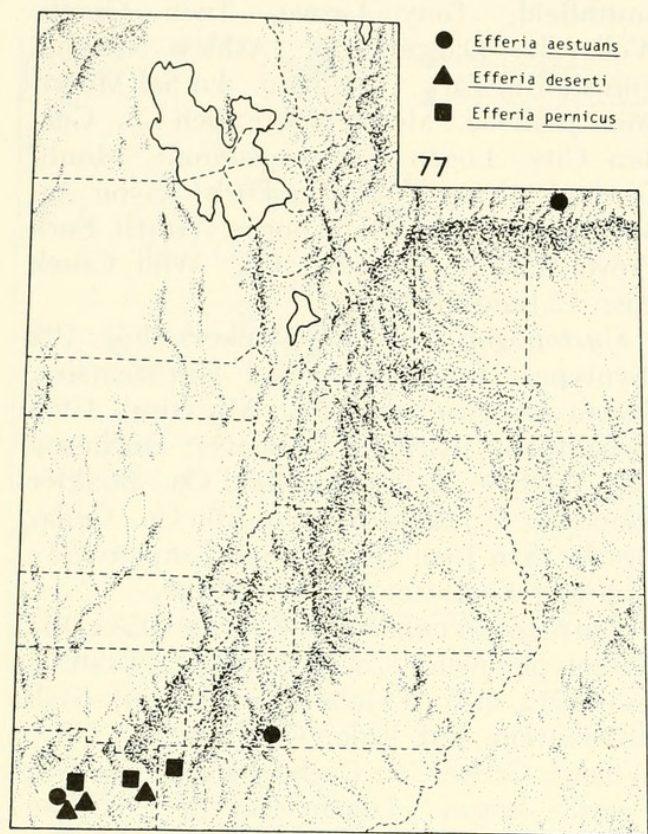
Cyrtopogon curtistylus Curran 1923a: 133 [Holotype: male, Cache Junction, Utah, 3 June 1912, in C. W. Johnson collection]. Utah distribution: Box Elder Co.: Brigham City, Willard; Cache Co.: Cache Junction, Beaver Creek, Logan, Logan Canyon, Sardine Canyon; Davis Co.: Bountiful; Rich Co.: Logan Canyon summit; Utah Co.: Glacier Park, Timpanogos, 2 mi W Cascade Springs, Pump-house Hill. 2 July–3 August.

Cyrtopogon dasylloides Williston 1883: 11 [Holotype: male, Washington Territory, in KU]. Utah distribution: Cache Co.: Blacksmith Fork Canyon, Logan. 16 May–12 June.

Cyrtopogon idahoensis Wilcox and Martin 1936: 82 [Holotype: male, Parma, Idaho, 13 May 1934, in CAS]. Utah distribution: Cache Co.: Blacksmith Fork Canyon, Cold Spring–Mendon, Logan, Mendon, Sardine Canyon; Garfield Co.: Aquarius Plateau; Rich Co.: Monte Cristo; San Juan Co.: Bear Ears; Utah Co.: Payson Canyon; Weber Co.: 13 mi S Monte Cristo. 9 June–23 July.

Cyrtopogon jemezi Wilcox and Martin 1936: 47 [Holotype: male, Valle Grande, Jemez Mountains, New Mexico, 6 July 1930, in CAS]. Utah distribution: Grand Co.: Lake Oowah; Uintah Co.: Brownie Canyon. 10 June–22 July.

Cyrtopogon montanus Loew 1874: 362 [Holotype: male, Sierra Nevada, in MCZ]. Utah distribution: Box Elder Co.: Willard Peak; Cache Co.: Card Canyon, Dry Canyon, Franklin Basin, Green Canyon, West Hodges Canyon, Hyrum, Logan, Mount Naomi,



Figs. 77–80. Utah Asilidae, distribution: 77, *Efferia aestuans*, *Efferia deserti*, and *Efferia pernicious*; 78, *Efferia cana*, *Efferia bicolor*, and *Efferia basini*; 79, *Efferia benedicti*; 80, *Efferia costalis*.

Providence, Tony Grove, Wellsville Mountains; Daggett Co.: Summit Springs; Duchesne Co.: Duchesne, Mirror Lake, Wolf Creek Pass, Yellowstone Ranger Station; Garfield Co.: Aquarius Plateau; Juab Co.: Mount Nebo Loop; Rich Co.: Logan Canyon summit; San Juan Co.: Blanding; Sevier Co.: Highway 4; Summit Co.: Bear River Ranger Station, Beaver Creek Ranger Station; Uintah Co.: Brownie Canyon, Brush Creek; Washington Co.: Pine Valley Mountains. 12 May–15 July.

***Cyrtopogon plausor* Osten Sacken 1877:** 297 [Syntypes: four males and two females, no locality listed, in MCZ]. Utah distribution: Cache Co.: Cache Valley; Garfield Co.: Aquarius Plateau, Boulder Mountain; Grand Co.: La Sal Mountains; San Juan Co.: Blanding, Elk Ridge; Summit Co.: Bear River Ranger Station; Utah Co.: Aspen Grove; Wasatch Co.: Strawberry Valley; Washington Co.: Pine Valley, Zion National Park; Wayne Co.: Bicknell, Boulder Mountain, Hanksville; Weber Co.: Farr West. 4 June–10 August.

***Cyrtopogon profusus* Osten Sacken 1877:** 305 [Syntypes: male and female, Morino Valley, New Mexico, 1 July, in MCZ]. Utah distribution: Grand Co.: La Sal Mountains; Utah Co.: Mount Timpanogos. 21 July–17 August.

***Cyrtopogon pulcher* Back 1909:** 274 [Holotype: male, Palmer Lake, Colorado, 10 July, in USNM]. Utah distribution: Box Elder Co.: Devils Gate, Willard Basin; Cache Co.: Beaver Mountain, Blacksmith Fork Canyon, Dry Lake, Logan Canyon, Tony Grove; Daggett Co.: Deep Creek, Sheep Creek; Emery Co.: Green River; Garfield Co.: Boulder Mountain; Rich Co.: Logan Canyon summit; Summit Co.: Bear River Ranger Station; Utah Co.: Aspen Grove, Mount Timpanogos; Wasatch Co.: Daniels Canyon summit; Washington Co.: Leeds. 22 May–14 August.

***Cyrtopogon rufotarsus* Back 1909:** 275 [Holotype: male, Gallatin Co., Montana, 8,000–9,000 ft, 9–11 July, in University of Massachusetts collection]. Utah distribution: Duchesne Co.: Mirror Lake, Uinta Mountains; Grand Co.: Geyser Pass; Kane Co.: Long Valley; Sanpete Co.: Ephraim Canyon; Summit Co.: Trial Lake. 14 June–13 August.

***Cyrtopogon stenofrons* Wilcox and Martin 1936:** 52 [Holotype: male, Grant Co., New Mexico, 24 June 1934, in CAS]. Utah distribution: Cache Co.: Logan; Wayne Co.: Capitol

Reef. 1 September–17 October.

***Cyrtopogon thompsoni* Cole** in Cole and Lovett, 1921: 255 [Syntypes: male and female, Burns, Oregon, May 1919, in CAS]. Utah distribution: Box Elder Co.: Curlew Valley; Daggett Co.: Clay Basin; Utah Co.: Goshen Springs. 16 June.

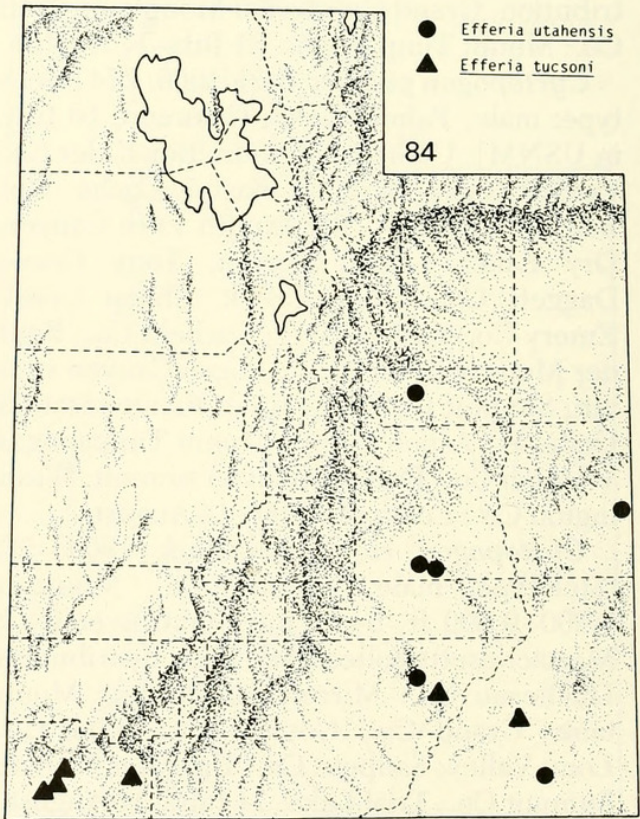
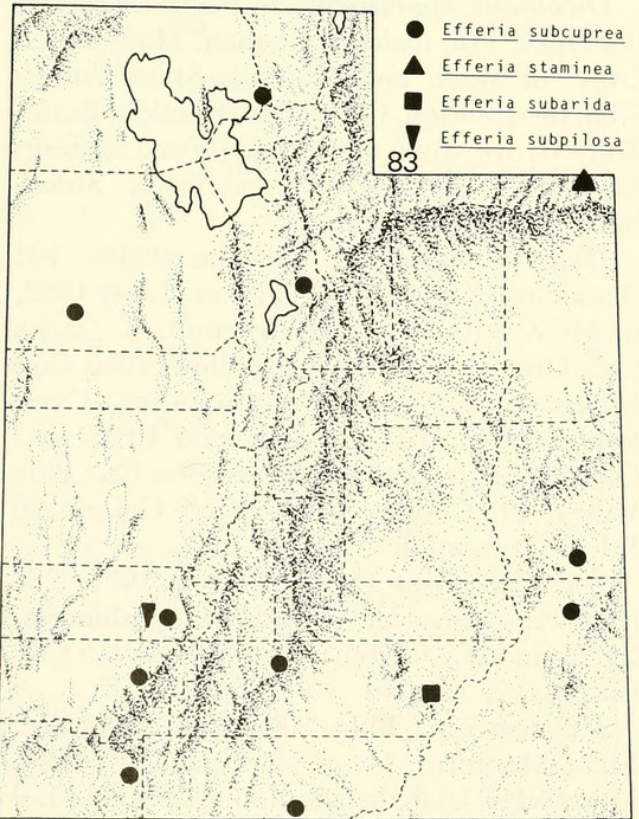
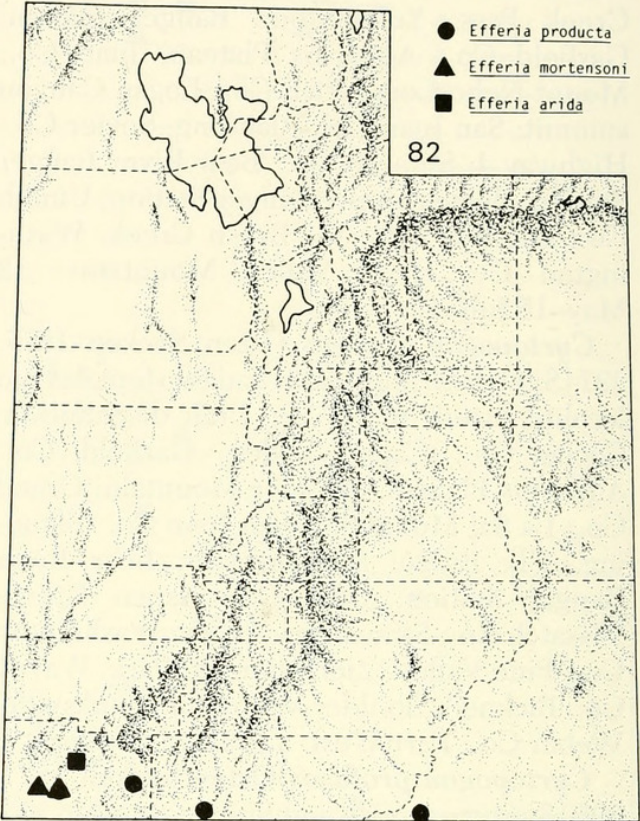
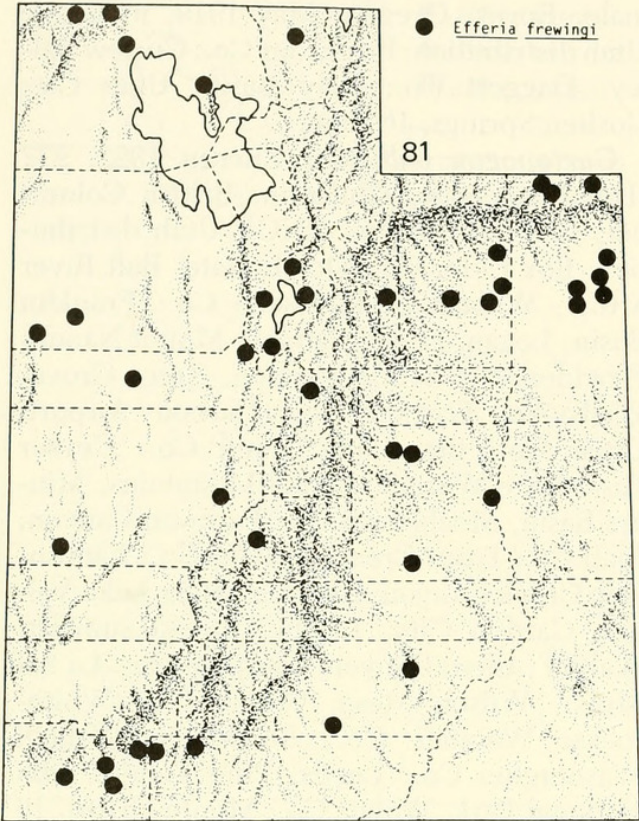
***Cyrtopogon willistoni* Curran 1922:** 277 [Holotype: male, Chilcotin, British Columbia, 16 June 1920, in CNC]. Utah distribution: Box Elder Co.: Devils Gate, Raft River Mtns., Willard Peak; Cache Co.: Franklin Basin, Logan, Logan Canyon, Mount Naomi, Providence, Sardine Canyon, Tony Grove, Wellsville; Carbon Co.: Carbon Airport; Davis Co.: Bountiful; Grand Co.: Geyser Pass, Lake Warner, La Sal Mountains, Miners Basin, Moab; Iron Co.: Parowan Canyon; Juab Co.: Trout Creek; Millard Co.: Kanosh, Oak Creek Canyon; Rich Co.: Bear Lake Valley, Garden City, Logan Canyon summit, Walton (Allen) Canyon; San Juan Co.: La Sal Mtns., Wilson Mesa; Uintah Co.: White-rocks; Wasatch Co.: Strawberry Valley; Washington Co.: Leeds, Pine Valley, Zion National Park; Weber Co.: Monte Cristo. 16 May–14 August.

***Dicolonus sparsipilosum* Back 1909:** 247 [Cotypes: Two males, Bozeman, Montana, in Univ. of Mass. and Montana State Univ.]. Utah distribution: Cache Co.: Franklin Basin, Tony Grove; Rich Co.: Logan Cyn. summit; Utah Co.: Provo Cyn.; Wasatch Co.: Strawberry Valley. 1–17 July.

***Dioctria henshawi* Johnson 1918:** 103 [Holotype: Yakima, Washington, 2 July 1882, in MCZ #10036]. Utah distribution: Cache Co.: Green Cyn., Spring Hollow; Rich Co.: Logan Cyn. summit, Walton (Allen) Cyn.; Summit Co.: 10 mi E Kamas; Utah Co.: Oquirrh Mtns., Provo; Washington Co.: Pine Valley, St. George; Weber Co.: Ogden. 20 July–5 September.

***Dioctria pusio* Osten Sacken 1877:** 288 [Holotype: Female, Sonoma Co., California, 4 July, in MCZ]. Utah distribution: Utah Co.: Castella. 22 August.

***Dioctria vera* Back 1909:** 256 [Holotype: Male, Monterey Co., California, 2 July 1896, in AMNH]. Utah distribution: Cache Co.: Logan; Duchesne Co.: Whiterocks; Garfield Co.: Boulder Mtn.; Grand Co.: Castleton; Juab Co.: Deep Creek Mtns. near Callao; Kane Co.: Mt. Carmel; Millard Co.: Kanosh



Figs. 81–84. Utah Asilidae, distribution: 81, *Efferia frewingi*; 82, *Efferia producta*, *Efferia mortensoni*, and *Efferia arida*; 83, *Efferia subcuprea*, *Efferia staminea*, *Efferia subarida*, and *Efferia subpilosa*; 84, *Efferia utahensis* and *Efferia tucsoni*.

Cyn., Oak Cr. Cyn.; San Juan Co.: La Sal Mtns., Mill Cr.; Washington Co.: Deep Cr., Leeds, Pine Valley; Wayne Co.: Grover. 13 June–20 August.

***Diogmites grossus* Bromley** 1936: 236 [Holotype: Male, Lamar, Prower Co., Colorado, 25 August 1925, in Bromley Collection]. Utah distribution: Box Elder Co.: Pilot Range, Promontory, Snowville; Cache Co.: Cornish, Dry Cyn., Hyrum, Logan, Providence; Davis Co.: Clearfield; Duchesne Co.: Bluebell; Grand Co.: Moab; Juab Co.: Topaz Mtn.; Kane Co.: Kanab; Millard Co.: Delta, Flowell, Garrison, Holden; Salt Lake Co.: Magna, Midvale; Tooele Co.: Camelback, Little Granite Mtn., Skull Valley, Simpson Butte; Utah Co.: Alpine, Goshen, Hobbie Cr., Lincoln Beach, Provo, Rock Cyn., Spanish Fork; Washington Co.: Leeds, St. George, Zion National Park; Weber Co.: Ogden, South Weber. 30 July–11 September.

***Eucyrtopogon comantis* Curran** 1923a: 116 [Holotype: Male, Chilcotin, B.C., 29 April 1920, in CNC #565]. Utah distribution: Utah Co.: Aspen Grove, Emerald Lake, Glacier Lake, Mount Timpanogos. No dates with labels.

***Eucyrtopogon* spp.** Utah distribution: Cache Co.: Dry Cyn., Logan Cyn., Logan Peak, Twin Cr.; Duchesne Co.: Forest Camp, Uintah Cyn., Uinta Mtns., Wolf Cr.; Iron Co.: Cedar City; Rich Co.: Logan Cyn. summit; Tooele Co.: Vernon Cr.; Utah Co.: Aspen Grove; Wasatch Co.: Soldier Summit; Weber Co.: Eden.

***Haplopogon utahensis* Wilcox** 1966d: 99–106 [Holotype: Male, 7 mi N St. George, Utah, Hwy 91, 1 June 1963, in CAS]. Utah distribution: Washington Co.: Washington. 1–8 June.

***Heteropogon arizonensis* Wilcox** 1941: 55 [Holotype: Male, White Mtns., Arizona, September, in CAS]. Utah distribution: Millard Co.: Oak City. 6–25 June.

***Heteropogon maculinervis* James** 1937a: 12 [Holotype: Female, Masonville, Colorado, 4 Sep 1934, in CSU]. Utah distribution: Beaver Co.: 9 mi E Beaver; Box Elder Co.: Clear Cr., Fielding; Cache Co.: Avon Cyn., Green Cyn., Providence, Twin Cr.; Daggett Co.: Pipe Cr.; Grand Co.: La Sal Mtns.; Iron Co.: Cedar City; Kane Co.: Zion—Chamberlain Ranch; Tooele Co.: Granite Mtn., Johnsons Pass; Uintah Co.: Little Mtn., Summit, Utah

State Exp. Sta.; Utah Co.: Payson Cyn., West Cyn.; Wasatch Co.: Soldier Summit; Washington Co.: Zion National Park; Weber Co.: Huntsville. 6 August–4 September.

***Heteropogon martini* Wilcox** 1965: 207 [Holotype: Male, Montgomery Pass, Nevada, 6 July 1958, in Wilcox Collection in CAS]. Utah distribution: Box Elder Co.: Snowville; Cache Co.: Logan, Wellsville Cyn.; Daggett Co.: Sheep Cr.; Davis Co.: Clearfield; Emery Co.: 4 air mi N Gilson Butte; Millard Co.: Fillmore, warm spring near Gandi; Utah Co.: Fairfield, west side Utah Lake, Lehi. 16 June–4 September.

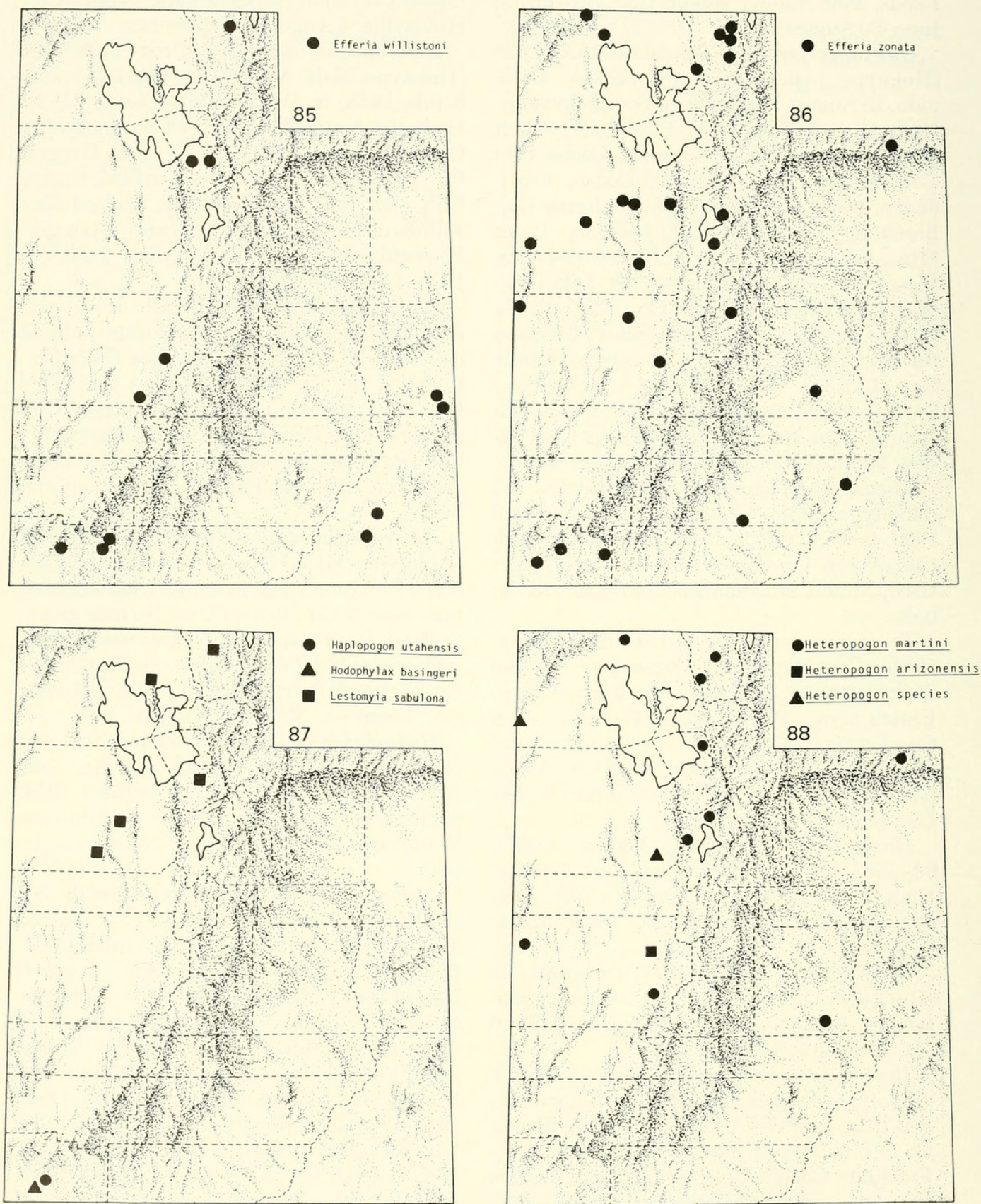
***Heteropogon senilis* (Bigot)** 1878: 423 [Holotype: sex not known, California, in Bigot collection]. Utah distribution: Box Elder Co.: Lucin, 1 mi NE Mantua; Cache Co.: Card Cyn., Green Cyn., Logan Cyn.; Daggett Co.: Palisade Park Camp; Iron Co.: Kanarraville, near Parowan; Millard Co.: Oak Cr. Cyn.; Utah Co.: American Fork. 16 June–4 September.

***Heteropogon stonei* Wilcox** 1965: 207–222 [Holotype: Male, Hualapai Mtns., Arizona, 6,000 ft, 4 June 1962, in CAS]. Utah distribution: Beaver Co.: Beaver Cyn. No date given.

***Heteropogon* species 1.** Two specimens, undescribed. Utah distribution: Box Elder Co.: Tecoma Range—Copper Mtns.; Tooele Co.: Lofgreen. No dates on labels.

***Hodophylax basingeri* Pritchard** 1938: 130 [Holotype: Female, Quail Spring, San Bernardino Co., California, 5 October 1934, in Basinger collection]. Utah distribution: Washington Co.: St. George. No date on label.

***Holopogon albipilosus* Curran** 1923b: 207 [Holotype: Male, Vernon, B.C., 5 August 1920, in CNC #569]. Utah distribution: Beaver Co.: Beaver, Greenville, 9 mi E Beaver; Box Elder Co.: Park Valley, Portage; Cache Co.: Ant Valley, Blacksmith Fork Cyn., Logan, Mendon; Duchesne Co.: Duchesne, Fort Duchesne, Tabiona, Whiterocks; Garfield Co.: Panguitch; Grand Co.: Dead Horse Point, Green River, 378 river mile; Iron Co.: Paragonah, Parowan; Juab Co.: Nephi, Trout Cr.; Kane Co.: Kanab; Millard Co.: Oak City, Pahvant, Scipio; Morgan Co.: Devils Slide; Piute Co.: Circleville; Rich Co.: Laketown, North Eden, Walton (Allen) Cyn.; Salt Lake Co.: Bluffdale, Magna, Salt Lake City; Sanpete Co.: Indianola, Manti, Moroni;



Figs. 85–88. Utah Asilidae, distribution: 85, *Efferia willistoni*; 86, *Efferia zonata*; 87, *Haplopogon utahensis*, *Hodophylax basingeri*, and *Lestomyia sabulona*; 88, *Heteropogon martini*, *Heteropogon arizonensis*, and *Heteropogon species 1*.

Sevier Co.: Elsinore, Glenwood, Richfield; Summit Co.: Red Rock Cyn.; Tooele Co.: Camelback, Dugway Proving Grounds, Little Granite Mtns.; Uintah Co.: Hayden, La Point, Naples, Tridell, Vernal, Whiterocks; Utah Co.: Alpine Loop, Aspen Grove, Lehi, Lindon, North Fork Provo Cyn., Payson, Provo, Provo Cyn., Spring Lake, Springville; Wasatch Co.: Heber, Strawberry Valley; Washington Co.: Pine Valley; Wayne Co.: Cainville, Grover. 1 June–5 August.

Holopogon caesariatus Martin 1959: 1–40 [Holotype: Male, Alpha, Long Valley, Idaho, 6 July 1934, in AMNH]. Utah distribution: Cache Co.: Blacksmith Fork Cyn. 7 August.

Holopogon currani Martin 1959: 17 [Holotype: Male, Winona, Arizona, 21 July 1949, in AMNH]. Utah distribution: Daggett Co.: Manila; Washington Co.: Leeds Cyn., Zion National Park; Wayne Co.: Grover. 11–28 July.

Holopogon mingusae Martin 1959: 21 [Holotype: Male, Mingus Mtn., Arizona, 3 July 1949, in AMNH]. Utah distribution: Garfield Co.: Aquarius Plateau, The Pass; Washington Co.: Zion National Park; Wayne Co.: Grover. 11 July–21 August.

Holopogon wilcoxi Martin 1959: 33 [Holotype: Male, San Carlos Lake, Arizona, May, in CAS]. Utah distribution: Beaver Co.: Beaver; Tooele Co.: South Camel Mtn. 13 July.

Laphystia annulata Hull 1957: 72 [Holotype: Male, near Navajo, Arizona, 11 July 1954, in Hull collection]. Utah distribution: Kane Co.: Coral Pink Sand Dunes, Mount Carmel Jct. 14 July.

Laphystia rubra Hull 1957: 74 [Holotype: Female, near Navajo, Arizona, 11 July 1954, in Hull collection]. Utah distribution: Emery Co.: Goblin Valley, 4 air mi N Gilson Butte, Wild Horse Creek; Grand Co.: Green River, 366 river mile; San Juan Co.: Bluff, Lime Cr. 7 July–26 August.

Laphystia tolandi Wilcox 1960: 344 [Holotype: Male, Lahontan Reservoir, Churchill Co., Nevada, 13 June 1949, in CAS]. Utah distribution: Box Elder Co.: Corinne, Locomotive Springs, Tremonton; Cache Co.: Cornish; Juab Co.: Fish Springs, Topaz Mtn.; Millard Co.: Delta, Fillmore; Sevier Co.: Richfield; Tooele Co.: Camelback, Granite Mtn.; Utah Co.: Spanish Fork. 14 June–14 August.

Laphystia utahensis Wilcox 1960: 345 [Holotype: Male, St. George, Utah, 12 mi NE Hwy 17, 23 May 1959, in CAS]. Utah distribution: Washington Co.: 12 mi NE St. George (near Hurricane). 22–23 May.

Lasiopogon albidus Cole and Wilcox 1938: 25 [Holotype: Male, 8 mi E Kiona, Washington, 23 April 1933, in CAS]. Utah distribution: Emery Co.: Green River (Gunnison Butte); Grand Co.: Moab. 7 May.

Lasiopogon aldrichii Melander 1923b: 139 [Syntypes: Male and female, Moscow Mtn., Idaho, 29 June 1918, repository not listed]. Utah distribution: Cache Co.: Logan Cyn.; Duchesne Co.: Roosevelt; Grand Co.: La Sal Mtns.; Rich Co.: Monte Cristo; Uintah Co.: Brush Cr., Whiterocks; Utah Co.: Mt. Timpanogos; Washington Co.: Leeds, Pinto. 24 June–21 July.

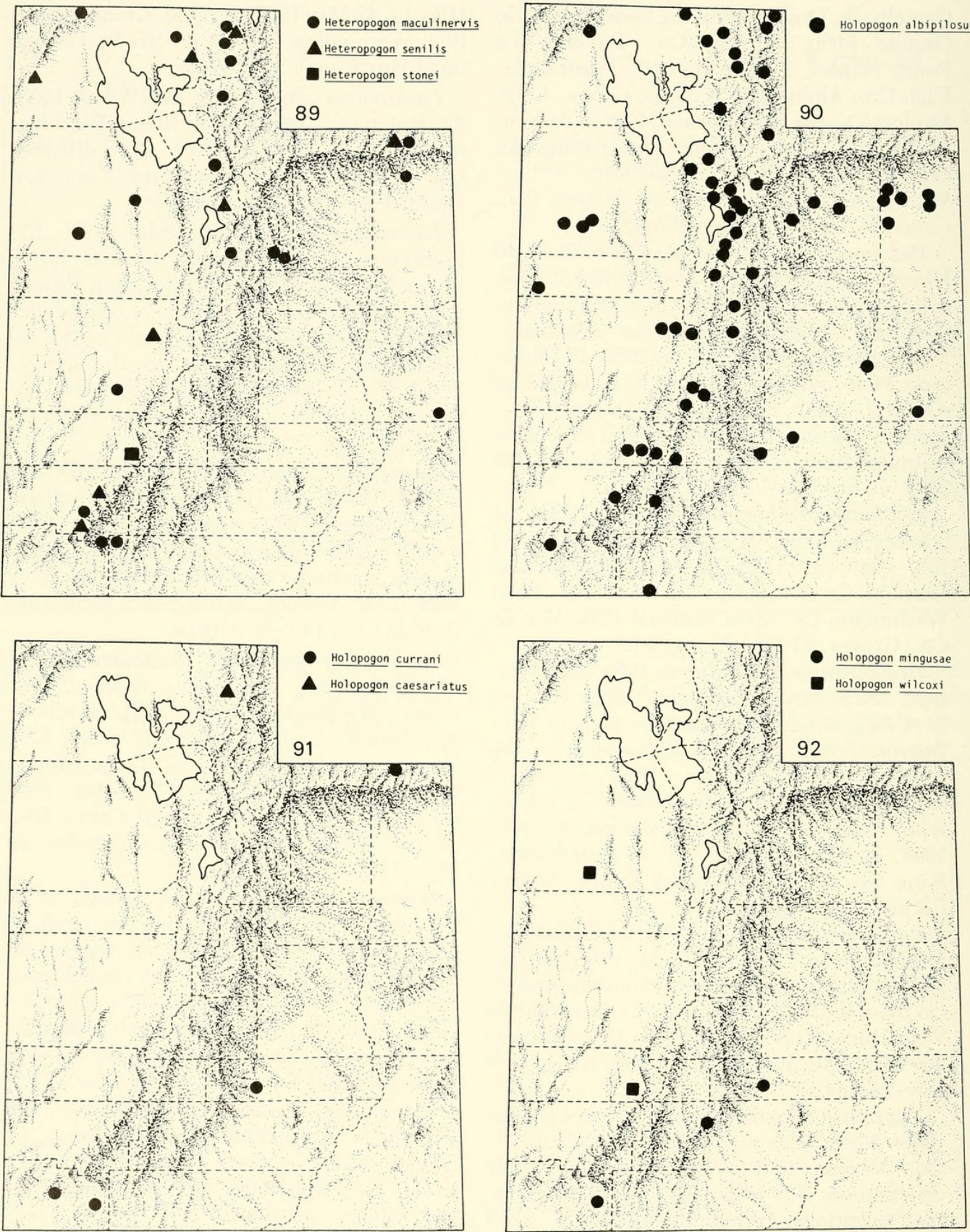
Lasiopogon cinereus Cole, in Cole and Lovett 1919: 229 [Holotype: Male, Hood River, Oregon, 24 September 1918, in CAS #476]. Utah distribution: Daggett Co.: Manila; Duchesne Co.: Uintah Co.: Merkeley Park (near Vernal), Whiterocks; Utah Co.: Hobbler Cr. 6 July–16 August.

Lasiopogon monticola Melander 1923b: 142 [Syntypes: Males and females, Mt. Adams, Washington, 24 July 1921, no repository listed]. Utah distribution: Cache Co.: Green Cyn., Logan Cyn., Mt. Logan; Grand Co.: Moab, Wilson Mesa–La Sal Mtns.; Rich Co.: Logan Cyn. summit, Monte Cristo; Uintah Co.: Whiterocks; Weber Co.: Ogden. 26 May–9 July.

Lestomyia sabulona Osten Sacken 1877: 292 [Syntypes: Male and female, Crafton, near San Bernardino, California, March, on dry gravelly soil, in MCZ]. Utah distribution: Box Elder Co.: Promontory Point; Cache Co.: Logan; Juab Co.: Topaz Mtn.; Salt Lake Co.: Salt Lake City; Tooele Co.: Dugway Proving Grounds, Skull Valley. 24 May–9 June.

Metapogon carinatus Wilcox 1964: 193 [Holotype: Male, Whitewater, California, 13 January 1948, in CAS]. Utah distribution: Uintah Co.: Split Mtn. Gorge. Date uncertain, “55-28” (2-8-1955?).

Myelaphus lobicornis Osten Sacken 1877: 287 [Holotype: Male, Snake River, Idaho, in MCZ]. Utah distribution: Cache Co.: Blacksmith Fork Cyn., Green Cyn., Hyrum Dam, Logan. 17–22 June.



Figs. 89–92. Utah Asilidae, distribution: 89, *Heteropogon maculinervis*, *Heteropogon senilis*, and *Heteropogon stonei*; 90, *Holopogon albipilosus*; 91, *Holopogon currani* and *Holopogon caesariatus*; 92, *Holopogon mingusae* and *Holopogon wilcoxi*.

Nannocyrtopogon aristatus James 1942: 126 [Holotype: Male, Arboles, Colorado, 6,700 ft, 17 May 1939, in CSU]. Utah distribution: Iron Co.: 5 mi E New Harmony; Washington Co.: Leeds Cyn., Oak Grove. 23 May–6 June.

Nicocles abdominalis Williston 1883: 17 [Holotype: Male, California, in KU]. Utah distribution: Washington Co.: Zion National Park. No date on label.

Nicocles utahensis Banks 1920: 66 [Holotype: Female, Eureka, Utah, 31 May, in MCZ]. Utah distribution: Cache Co.: Green Cyn., Hyrum, Logan, Logan Cyn., Sardine Cyn., USU; Emery Co.: Green River; Grand Co.: Moab; Juab Co.: Eureka; Salt Lake Co.: Little Mtn.; Utah Co.: Provo. 5 March–5 June.

Omninablautus nigronotum (Wilcox) 1935: 1 [Holotype: Male, Prairie Hill, Grant Co., Oregon, in CAS]. Utah distribution: Box Elder Co.: Etna. 12 August.

Ospriocerus abdominalis (Say) 1824: 375 [Holotype: Lost]. Utah distribution: Beaver Co.: Minersville; Box Elder Co.: Blue Cr., Collinston, Mantua, Promontory, Snowville; Cache Co.: Beaver Mtn., Cornish, Clarkston, Hyrum, Lewiston, Logan, Mendon, Providence, Smithfield; Daggett Co.: Douglas Dinosaur Quarry, Flaming Gorge; Davis Co.: Farmington; Duchesne Co.: Monarch, Mountain Home, Myton; Emery Co.: 2 mi E Gilson Butte, 9 air mi E Castledale, Sinbad Country, Wild Horse Cr. north of Goblin Valley, Woodside; Grand Co.: Castleton, Moab; Iron Co.: Cedar City; Juab Co.: Deep Cr. Mtns., Fish Springs, Jericho, Levan, Nephi, Trout Cr.; Kane Co.: Kanab; Millard Co.: Delta, Fillmore, Holden, Oasis, Pahvant, Scipio; Rich Co.: Bear Lake Valley, Dry Basin; Sevier Co.: Fremont Jct., Monroe Cyn., Richfield; Tooele Co.: Cedar Mtns., Dugway Proving Grounds, James Ranch, Lakeside Mtns., Little Granite Mtn., Ophir; Uintah Co.: Fort Duchesne, Gusher, 3 mi SW Jensen, Vernal; Utah Co.: Cedar Valley, Lehi, Provo, West Utah Lake; Wasatch Co.: Deer Cr. Reservoir; Washington Co.: Pine Valley, St. George, Zion National Park; Wayne Co.: Notom; Weber Co.: Ogden. 9 June–6 September.

Ospriocerus longulus (Loew) 1866: 28 [Holotype: in MCZ]. Utah distribution: Grand Co.: Castleton; Washington Co.: Santa Clara. 8–29 July.

Ospriocerus minos Osten Sacken 1877: 291 [Holotype: Male, Golden City, Colorado, 3 July, in MCZ]. Utah distribution: Emery Co.: 3 mi SSE Temple Mtn., San Rafael Desert; Grand Co.: Arches National Monument; Tooele Co.: Dugway Proving Grounds; Uintah Co.: 3 mi SW Jensen, Vernal; Utah Co.: 1 mi W Elberta; Wayne Co.: Notom. 25 July–31 July.

Ospriocerus vallensis Martin 1968: 401 [Holotype: Male, Grand View, Owyhee Co., Idaho, 9 July 1958, in CAS]. Utah distribution: Box Elder Co.: Cedar Hills, Steamboat Springs, Thiokol; Cache Co.: Providence; Rich Co.: Sage Cr. Jct.; Sevier Co.: Richfield. 4 June–11 July.

Saropogon mohawki Wilcox 1966b: 134 [Holotype: Male, Mohawk, Arizona, 16 July 1962, in CAS]. Utah distribution: Washington Co.: Ivins. 16 July.

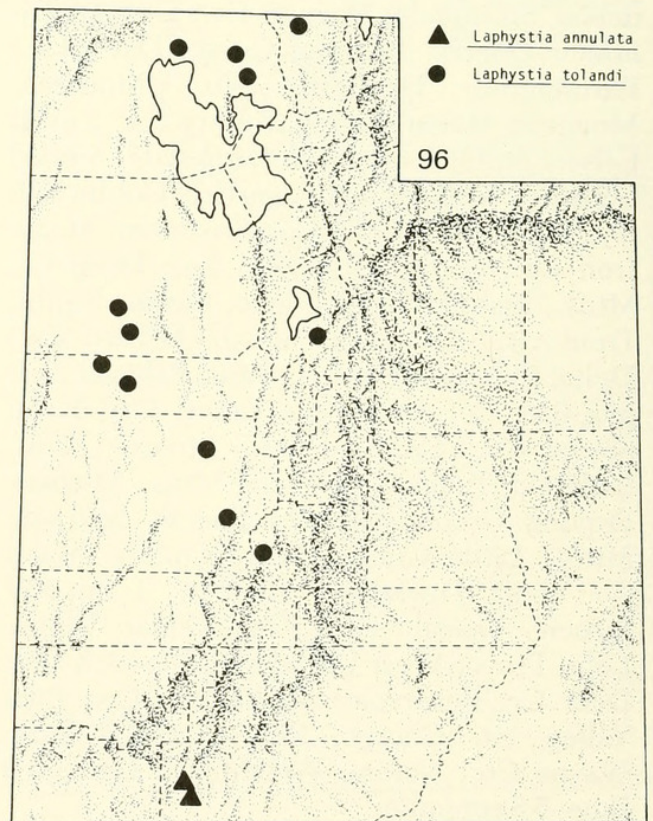
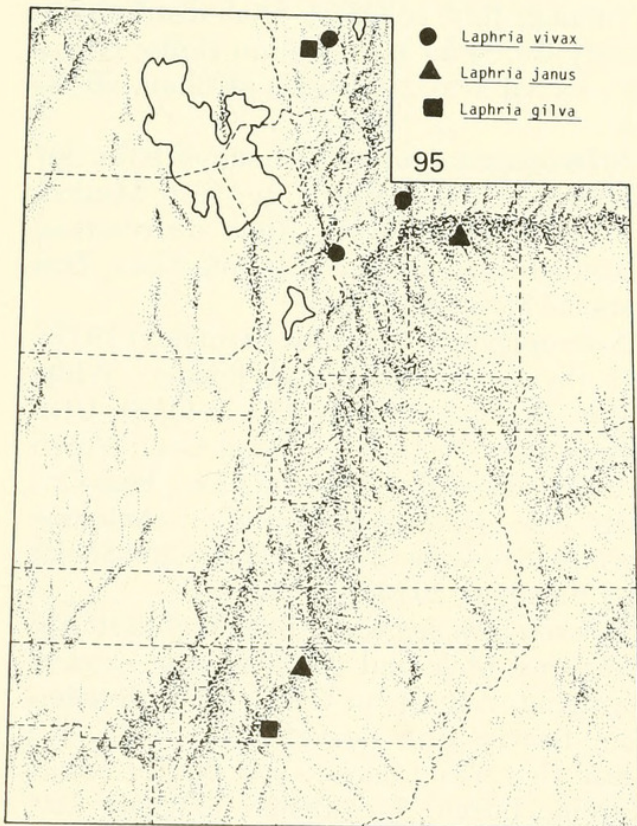
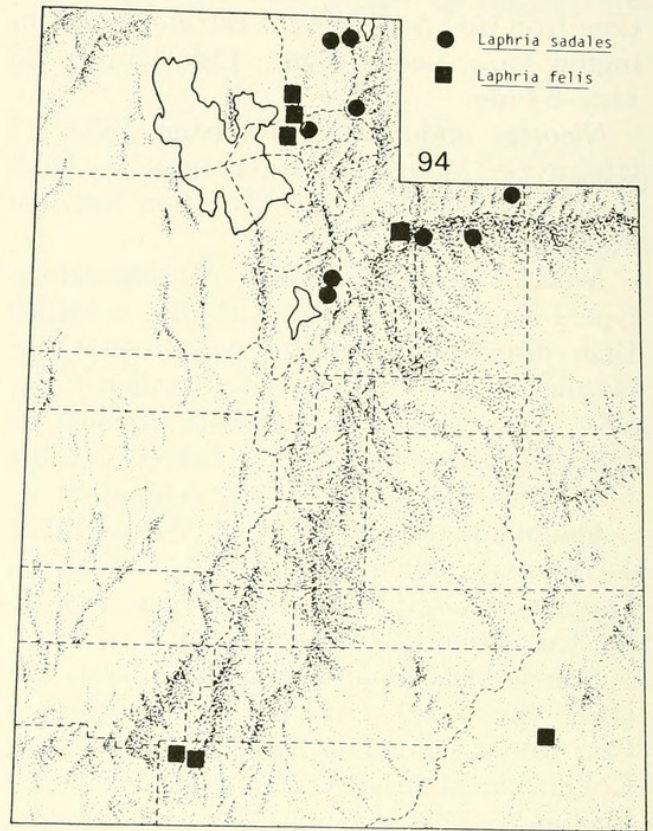
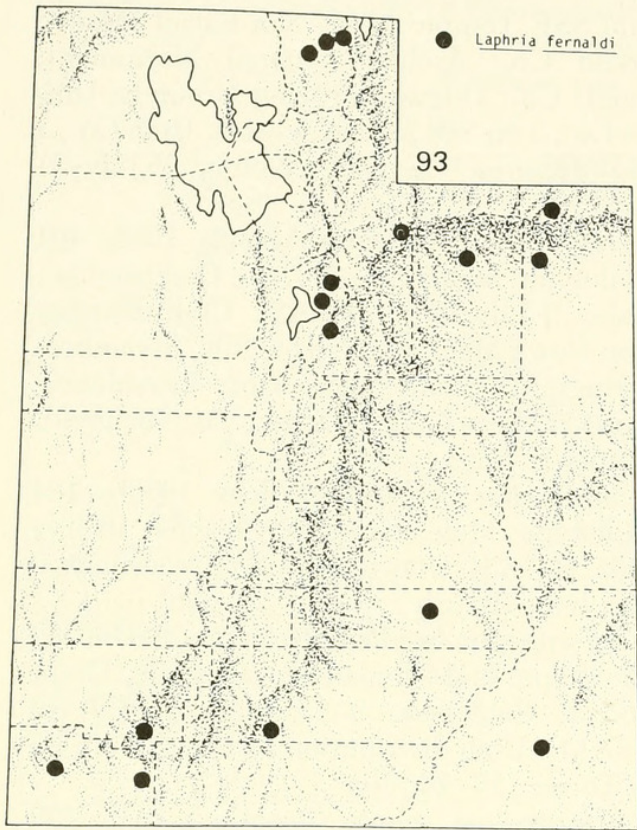
Scleropogon bradleyi (Bromley) 1937a: 309 [Holotype: Male (female on same pin), Grant Forest, California, 9–13 August 1937, in USNM]. Utah distribution: Wayne Co.: 6 mi W Torrey. 15–20 July.

Scleropogon coyote (Bromley) 1931: 429 [Syntypes: Male and female, near Lander, Wyoming, July, in OSU]. Utah distribution: Emery Co.: 4 air mi N Gilson Butte; Grand Co.: La Sal Mtns.; Utah Co.: Colton. 20–23 July.

Scleropogon duncani (Bromley) 1937a: 307 [Holotype: Male, Silver City, New Mexico, 24 June 1933, in CAS]. Utah distribution: Washington Co.: Rockville, Santa Clara, Zion National Park. 22–24 June.

Scleropogon indistinctus (Bromley) 1937a: 308 [Syntypes: Male and female, White Mtns., Arizona, August 1930, in CAS]. Utah distribution: Cache Co.: Logan Cyn., Providence; Daggett Co.: Hideout Cyn., Pipe Cr.; Juab Co.: Nephi; Millard Co.: Antelope Springs; Salt Lake Co.: Salt Lake City; Sevier Co.: Richfield. 26 May–16 August.

Scleropogon neglectus (Bromley) 1931: 430 [Syntypes: Male and Female, near Lander, Wyoming, August, in OSU]. Utah distribution: Beaver Co.: Beaver; Box Elder Co.: Clear Cr., Yost; Cache Co.: Beaver Mtn., Hyrum, Logan, Providence; Daggett Co.: Hideout Cyn., Manila; Emery Co.: Buckskin Springs, Goblin Valley; Garfield Co.: Boulder Mtn., 15 mi N Boulder; Grand Co.: La Sal Mtns.; Juab Co.: Callao, Topaz Mtn.; Millard



Figs. 93–96. Utah Asilidae, distribution: 93, *Laphria fernaldi*; 94, *Laphria sadales* and *Laphria felis*; 95, *Laphria vivax*, *Laphria janus*, and *Laphria gilva*; 96, *Laphystia annulata* and *Laphystia tolanti*.

Co.: Fillmore, Sutherland; Piute Co.: Utah Agricultural Research Station; Rich Co.: Woodruff; Tooele Co.: Camelback, Dugway Proving Grounds, Lakeside Mtns.; Washington Co.: Toquerville. 29 May–16 August.

Scleropogon picticornis Loew 1866: 26 [Holotype: Female, California, in MCZ]. Utah distribution: Kane Co.: Kanab; San Juan Co.: Bluff. 20 August–12 September.

Sintoria cazieri Wilcox 1972a: 51 [Holotype: Male, Holden, Utah, 18 September 1959, in AMNH]. Utah distribution: Emery Co.: Goblin Valley; Iron Co.: Beryl; Millard Co.: Holden; Washington Co.: Beaver Dam Slope on Joshua Trees, Red Cliffs Cmpgd. at lights; Weber Co.: Five Points. 16–27 September.

Stenopogon engelhardti Bromley 1937a: 301 [Syntypes: Male and female, Jacumba, California, 26 April 1935, in CAS]. Utah distribution: Box Elder Co.: Raft River Mtns.; Cache Co.: Blacksmith Fork Cyn., Logan Cyn., Tony Grove, Wellsville Cyn.; Daggett Co.: Elk Park; Duchesne Co.: 30 mi SW Duchesne; Garfield Co.: Boulder Mtn., Bryce Cyn.; Iron Co.: Cedar City; Juab Co.: Eureka; Rich Co.: Logan Cyn. summit; Salt Lake Co.: Dry Cyn., Little Mtn., Salt Lake City; Sanpete Co.: Indianola; Sevier Co.: Richfield; Tooele Co.: Lookout Mtn., Stansbury Island; Utah Co.: Alpine, Aspen Grove, Payson Cyn., Provo; Washington Co.: Zion National Park; Wayne Co.: Hanksville. 8 June–14 August.

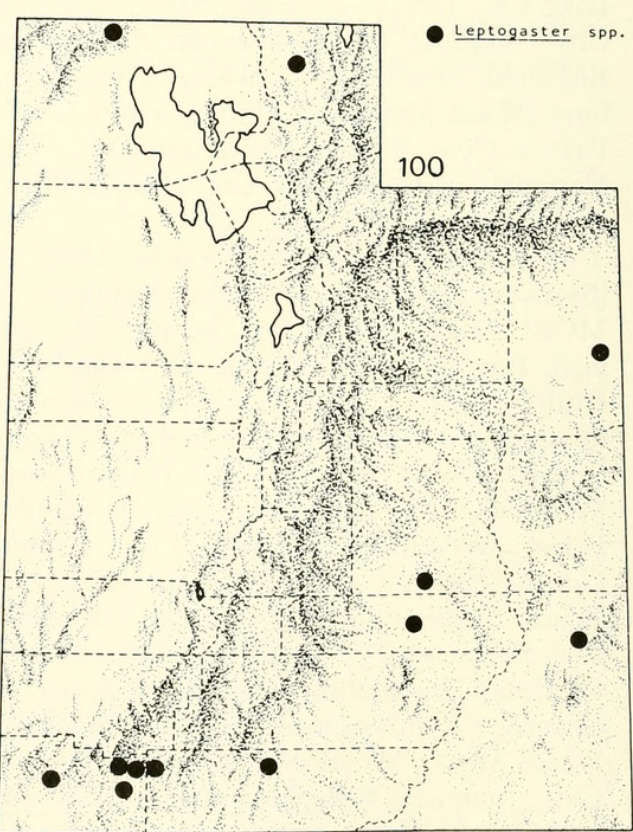
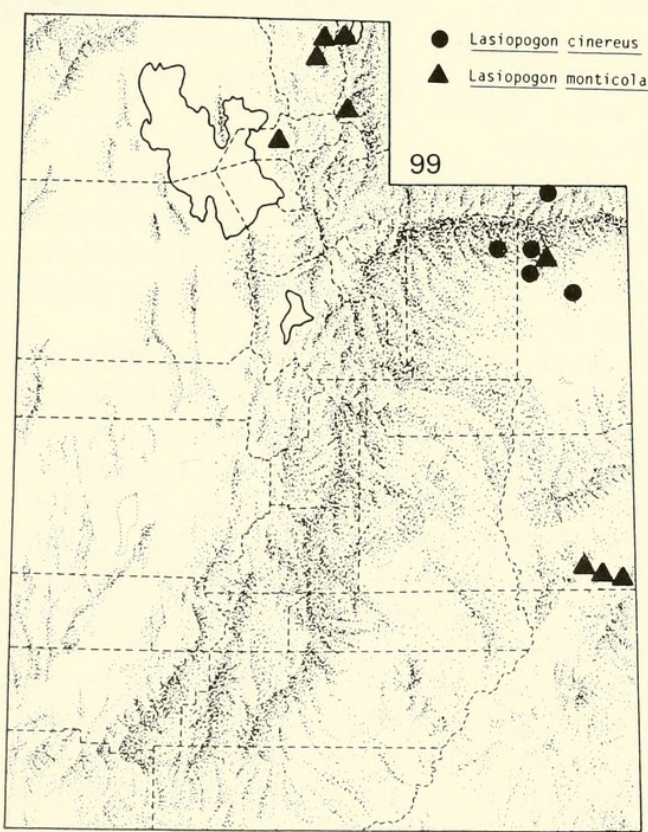
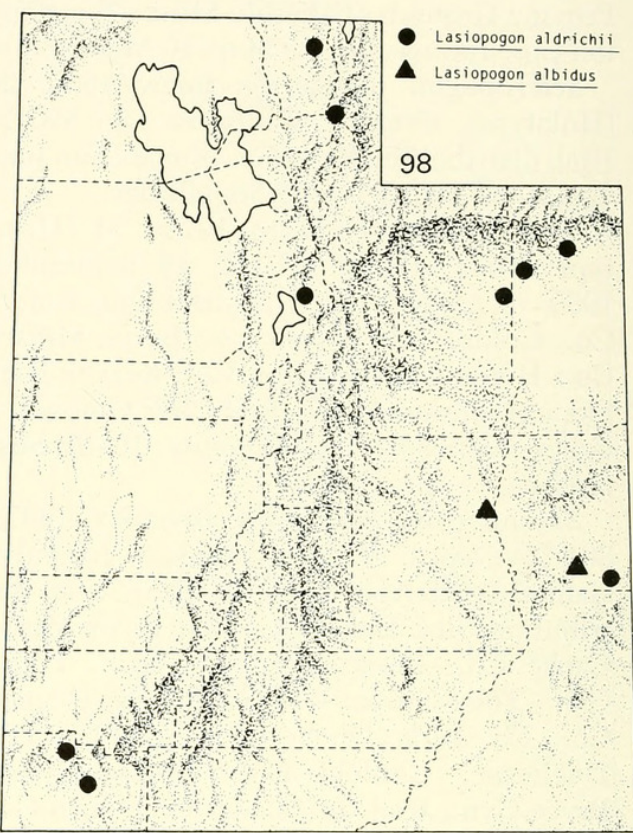
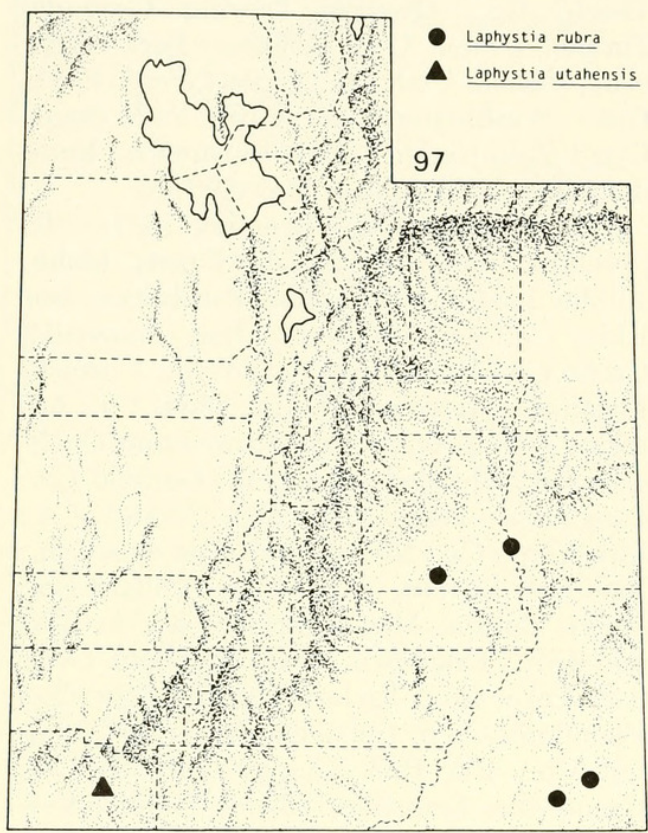
Stenopogon inquinatus Loew 1866: 27 [Syntypes: Male and female, Nebraska, in MCZ]. Utah distribution: Beaver Co.: Milford; Box Elder Co.: Cedar Cr., Clear Cr., Cutler Dam, Devils Gate, Mantua, Washakie; Cache Co.: Green Cyn., Logan, Logan Cyn., Providence, Tony Grove, Wellsville Cyn.; Carbon Co.: Dragerton, Price, Woodhill; Daggett Co.: Flaming Gorge, Hideout Cyn., Manila, Spirit Lake Road, Summit Ranger Station; Duchesne Co.: Roosevelt, Yellowstone Ranger Station; Garfield Co.: Boulder Mtn., Bryce Cyn., Escalante, Panguitch Lake, Tropic; Grand Co.: La Sal Mtns., Westwater; Iron Co.: Parowan Cyn.; Juab Co.: Fish Springs, Trout Cr.; Millard Co.: Fillmore, Oak Cr. Cyn.; Piute Co.: Marysvale; Rich Co.: Bear Lake Valley, Laketown, Logan Cyn. summit, Woodruff; Salt Lake Co.: Big Cottonwood Cyn., Parleys

Cyn., Salt Lake City; San Juan Co.: Bear Ears; Sanpete Co.: Gunnison, Indianola; Sevier Co.: Gooseberry, USDA (center of county); Tooele Co.: Dugway Proving Grounds, Timpie; Uintah Co.: Douglas, Fort Duchesne, Vernal; Utah Co.: Aspen Grove, Provo Cyn.; Washington Co.: Dixie Park (Snow Cyn.), Zion National Park; Wayne Co.: Boulder Mtn., Hanksville. 8 May–29 July.

Stenopogon martini Bromley 1937a: 303 [Syntypes: Male and female, Parma, Idaho, 13 May 1934, in CAS]. Utah distribution: Box Elder Co.: Collinston, Fielding, Snowville; Cache Co.: Blacksmith Fork Cyn., Cornish, Logan; Daggett Co.: Manila; Davis Co.: Antelope Island, Bountiful, Farmington; Duchesne Co.: Bluebell, Roosevelt; Garfield Co.: Panguitch, Panguitch Lake; Grand Co.: Moab; Iron Co.: Miners Peak, Parowan Cyn.; Juab Co.: Eureka, Topaz Mtn.; Millard Co.: Delta, Hatton, McCormick; Rich Co.: Garden City, Laketown, Walton (Allen) Cyn.; Salt Lake Co.: Taylorsville; Sanpete Co.: Fountain Green, Indianola, Seely Cr.; Summit Co.: Elk Park Cmpgd.; Tooele Co.: Grantsville, Stansbury Island, Timpie, Vernon Cyn.; Uintah Co.: Fort Duchesne, Vernal; Utah Co.: Aspen Grove, Provo, Spanish Fork; Wasatch Co.: Strawberry Valley; Wayne Co.: Fremont, Torrey; Weber Co.: Ogden, Ogden Cyn., Riverdale. 15 May–6 September.

Stenopogon mexicanus Cole 1923: 463 [Holotype: Male, Guaymas, Sonora, Mexico, 10 April 1921, in CAS #1341]. Utah distribution: Cache Co.: Logan; Grand Co.: Castleton. 24 July–1 September.

Stenopogon rufibarbis Bromley 1931: 431 [Holotype: Male, Lassen Co., California, 20 July 1911, in OSU]. Utah distribution: Beaver Co.: Beaver Cr.; Box Elder Co.: Devils Gate, Raft River Mtns., Willard Peak; Cache Co.: Blacksmith Fork Cyn., Card Cyn., Logan, Newton, Sardine Cyn., Wellsville; Daggett Co.: Manila; Duchesne Co.: Duchesne; Garfield Co.: Aquarius Plateau, The Pass; Grand Co.: Castle Valley, Moab (La Sal Mtns.); Iron Co.: Cedar City; Juab Co.: Eureka, Mt. Nebo; Kane Co.: Alton, Long Valley; Rich Co.: Garden City; Salt Lake Co.: Salt Lake City; San Juan Co.: Geyser Pass; Sanpete Co.: Fountain Green; Summit Co.: Park City; Tooele Co.: Tooele; Uintah Co.: Vernal; Utah Co.: Alpine, Aspen Grove, Spanish



Figs. 97–100. Utah Asilidae, distribution: 97, *Laphystia rubra* and *Laphystia utahensis*; 98, *Lasiopogon aldrichii* and *Lasiopogon albidus*; 99, *Lasiopogon cinereus* and *Lasiopogon monticola*; 100, *Leptogaster* spp.

Fork; Washington Co.: Leeds Cyn., Pine Valley; Wayne Co.: Hanksville; Weber Co.: Ogden. 20 May–25 July.

Stenopogon utahensis Bromley 1951: 8 [Syntypes: Male and female, Leeds, Utah, 20 June 1929, in USNM]. Utah distribution: Washington Co.: Leeds, St. George. 1–20 June.

Stichopogon fragilis Back 1909: 334 [Holotype: Female, Alamogordo, New Mexico, 24 April 1902, in AESP]. Utah distribution: Emery Co.: San Rafael Desert 3 mi SSE Temple Mtn., 5,300 ft; Millard Co.: Delta; Tooele Co.: Dugway Proving Grounds; Washington Co.: Santa Clara; 3 mi NW St. George. 24 May–4 July.

Stichopogon salinus (Melander) 1923c: 216 [Holotype: Male, Great Salt Lake, Utah, 31 July 1908, in Aldrich Collection]. Utah distribution: Beaver Co.: Minersville; Cache Co.: Cornish, Logan; Juab Co.: Topaz Mtn.; Millard Co.: Delta, Hatton, Pahvant; Salt Lake Co.: Great Salt Lake; Utah Co.: Aspen Grove, Goshen, Provo, Spanish Fork, west Utah Lake. 20 June–3 August.

Stichopogon trifasciatus (Say) 1823: 51 [Holotype: Lost]. Utah distribution: Duchesne Co.: Indian Creek, Roosevelt; Kane Co.: Kanab, Zion National Park near east entrance; Uintah Co.: Naples; Washington Co.: Santa Clara, Zion National Park. 25 June–19 August.

Taracticus ruficaudus Curran 1930: 4 [Holotype: Female, Mud Springs, Santa Catalina Mtns., Arizona, 17–20 July 1916, in AMNH]. Utah distribution: Alpine. 14 July.

Wilcoxia painteri Wilcox 1972b: 43–47 [Holotype: Male, Datil, Continental Divide, Catron Co., New Mexico, 17 July 1930, in Painter Collection?]. Utah distribution: Box Elder Co.: Howell, Nafton, Showell; Emery Co.: east of Block Mtn., Sinbad Country; Garfield Co.: 4 mi N Boulder; Kane Co.: 40 mi E Kanab, 16 mi W Glen Cyn., 3 mi W Wahweep, Zion National Park near east entrance; Millard Co.: 23 mi W Delta; Uintah Co.: 16 mi SW Vernal; Wayne Co.: east edge Capitol Reef. 19 May–16 September.

Willistonina bilineata (Williston) 1883: 11 [Holotype: Female, Northern California, in KU]. Utah distribution: Wasatch Co.: Trout Cr. Spring (near Strawberry Reservoir). 20 August.

Subfamily Laphriinae

Atomosia mucida Osten Sacken 1887: 184 [Holotype: Sex not known, Presidio, Mexico]. Utah distribution: Washington Co.: Leeds Cyn., Rockville, Santa Clara. 18 July–20 August.

Cerotainiops abdominalis (Brown) 1897: 103 [Holotype: information not found]. Utah distribution: Beaver Co.: Milford; Garfield Co.: Escalante Desert, The Hall; Millard Co.: Hatton, Hinckley, Kanosh; San Juan Co.: Bluff; Tooele Co.: Dugway Proving Grounds. 5 June–12 July.

Dasylechia atrox (Williston) 1883: 28 [Holotype: Sex not known, Pennsylvania]. Utah distribution: Cache Co.: Logan. No date on label, Utah specimen in AMNH.

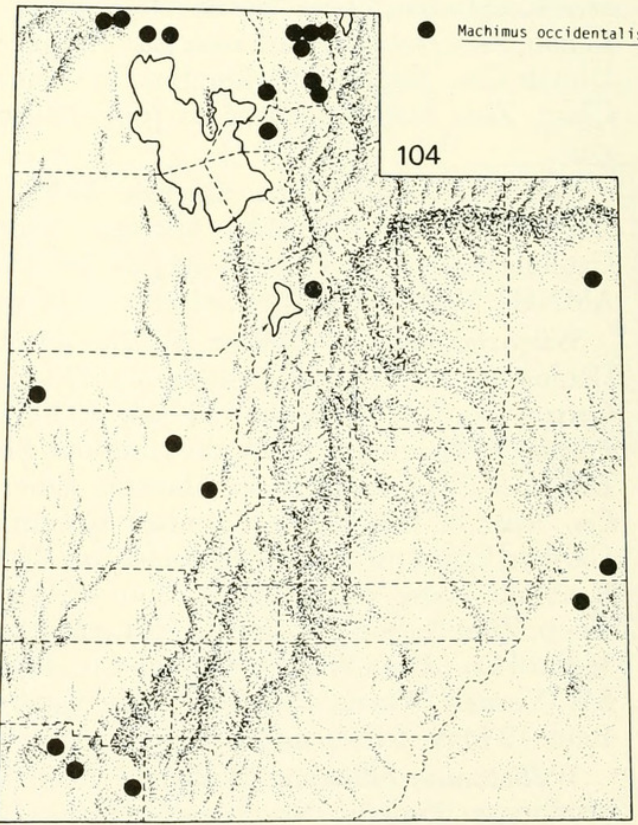
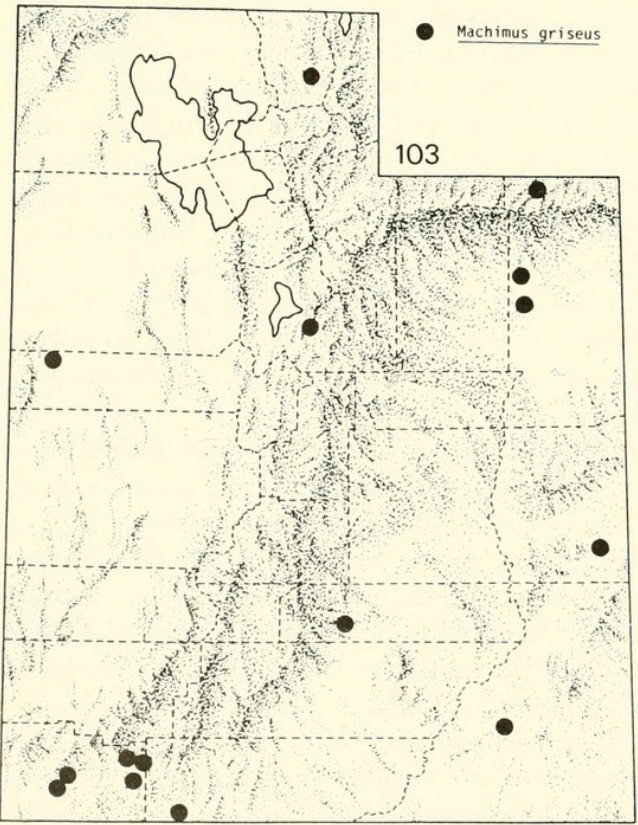
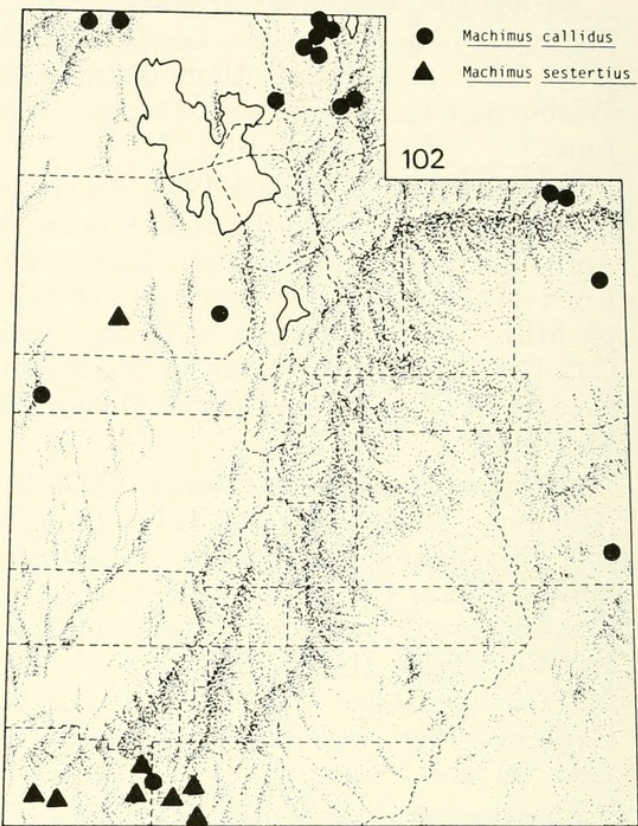
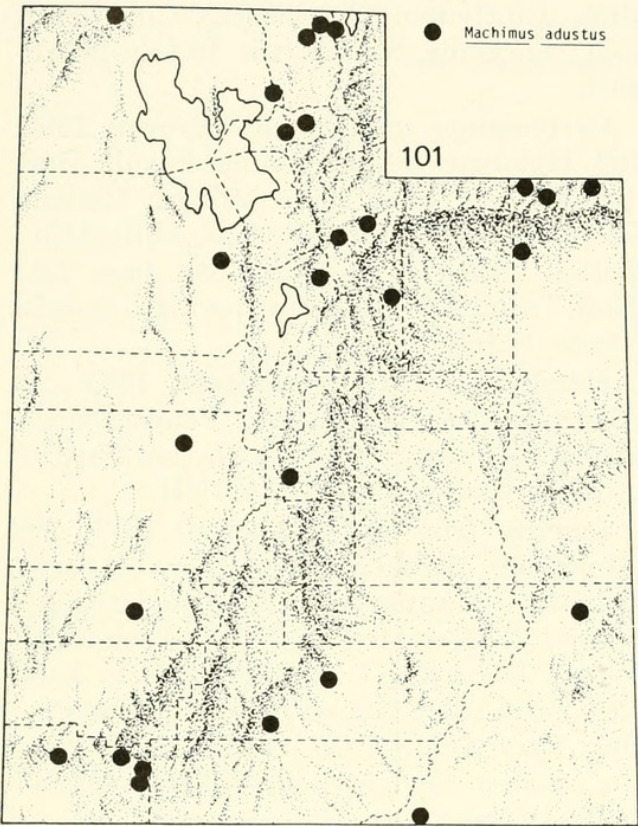
Laphria felis (Osten Sacken) 1877: 286 [Holotype: Webber Lake, Sierra Nevada, California, no sex or repository listed in Osten Sacken (1878) or McAtee (1919)]. Utah distribution: Box Elder Co.: Willard Peak; Kane Co.: Duck Lake, Navajo Lake; San Juan Co.: Bear Ears; Summit Co.: Trial Lake; Weber Co.: Ogden, Ogden Peak, Willard Peak. 17 June–3 August.

Laphria fernaldi (Back) 1904: 290 [Syntypes: Males and females, Colorado, in either UM or AESP]. Utah distribution: Cache Co.: Green Cyn., Logan, Logan Cyn., Twin Creek; Daggett Co.: Elk Park; Duchesne Co.; Garfield Co.: Bryce Cyn.; Iron Co.: Deer Haven Campgd.; Rich Co.: Logan Cyn. summit; San Juan Co.: Bear Ears; Summit Co.: Trial Lake; Uintah Co.: Whiterocks Cyn., Utah Co.: Aspen Grove, Hobbie Cr. Cyn., Provo; Washington Co.: Pine Valley, Zion National Park; Wayne Co.: Hanksville. June–September.

Laphria gilva (Linnaeus) 1758: 605 [Holotype: Lost]. Utah distribution: Cache Co.: Logan; Garfield Co.: Bryce Cyn. 5 June.

Laphria janus McAtee 1919: 153 [Holotype: Male, near summit of Mt. Washington, New Hampshire, in USNM]. Utah distribution: Duchesne Co.: Uinta Mtns.; Garfield Co.: Aquarius Plateau. No dates on labels.

Laphria sadales Walker 1849: 378 [Holotype: Sex not known, New York, in British Museum]. Utah distribution: Cache Co.: Green Cyn.; Duchesne Co.: Mirror Lake, Uinta Mtns.; Rich Co.: Logan Cyn. summit, Monte Cristo; Summit Co.: Hole in Rock



Figs. 101–104. Utah Asilidae, distribution: 101, *Machimus adustus*; 102, *Machimus callidus* and *Machimus sestertius*; 103, *Machimus griseus*; 104, *Machimus occidentalis*.

Cyn.; Uintah Co.; Utah Co.: Aspen Grove, Provo Cyn.; Weber Co.: Pineview. 21 July–16 August.

Laphria vivax Williston 1883: 30 [Holotype: Sex not known, Washington Territory, no repository listed in McAtee (1918)]. Utah distribution: Cache Co.: Logan Cyn., Tony Grove; Summit Co.: 3 mi SE Bear River Ranger Station; Wasatch Co.: Silver Lake. 5 August–11 September.

Subfamily Asilinae

Asilus auriannulatus Hine 1906 [Syntypes: Male and female, Hope Mtns., B.C., 1 July, no repository listed]. Utah distribution: Cache Co.: Blacksmith Fork Cyn., Green Cyn., Little Bear Cr., Logan, Logan Cyn., Twin Creek, Wellsville; Rich Co.: Logan Cyn. summit. 1–26 July.

Asilus formosus Hine 1918: 321 [Holotype: Male, Clary Co., Kansas, 29 August 1911, in the Hine Collection (OSU?)]. Utah distribution: Box Elder Co.: 25 mi SW Snowville; Cache Co.: Petersboro; Millard Co.: Fillmore; Tooele Co.: Lakeside Mtns.; Weber Co.: Huntsville. 10 July–13 August.

Asilus vescus Hine 1918: 320 [Holotype: Male, Monterey Co., California, 2 July 1896, in AMNH]. Utah distribution: Box Elder Co.: Willard Basin; Cache Co.: Blacksmith Fork Cyn.; Daggett Co.: Manila; Millard Co.: Delta; Rich Co.: Randolph. 15 June–1 September.

Efferia aestuans (Linnaeus) 1763: 413 [Holotype: Lost]. Utah distribution: Daggett Co.: Manila; Garfield Co.: Bryce Cyn.; Washington Co.: Snow Cyn. 19 May–11 August.

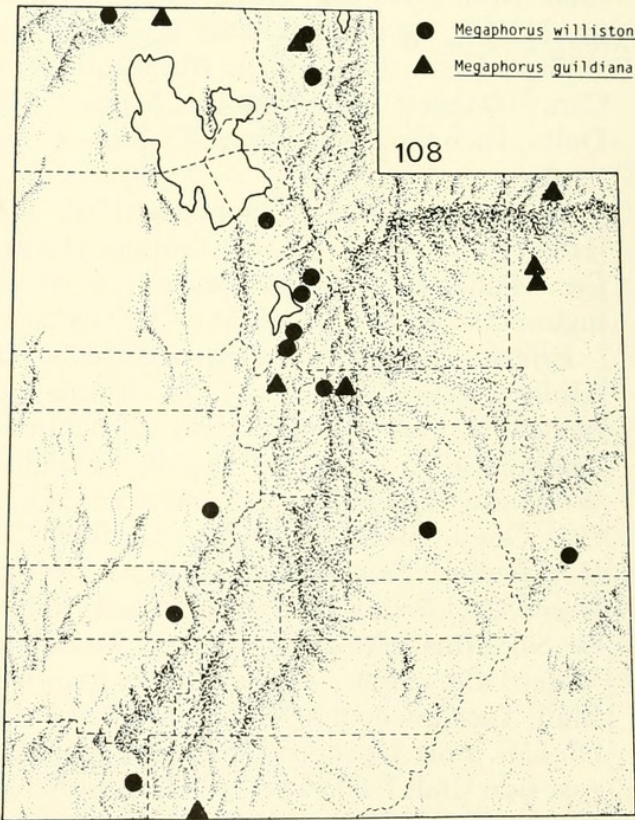
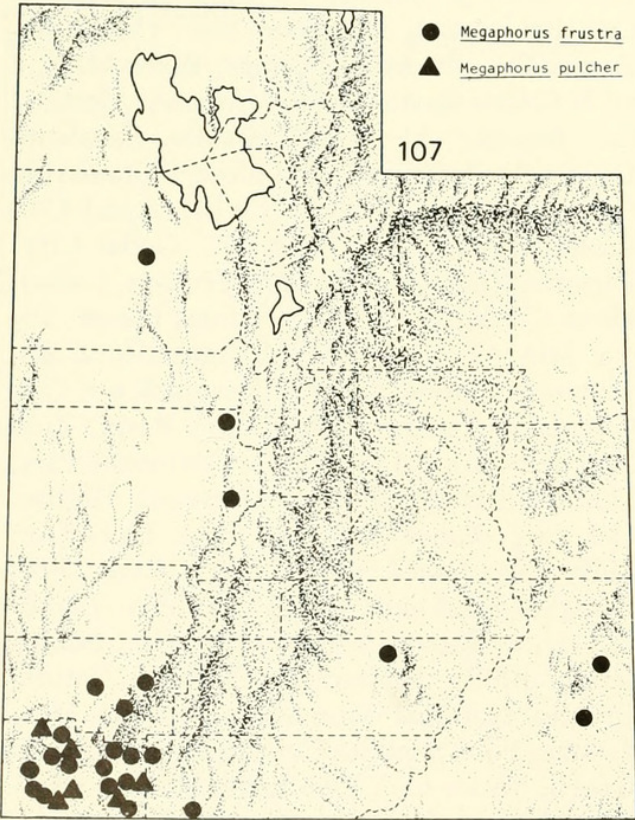
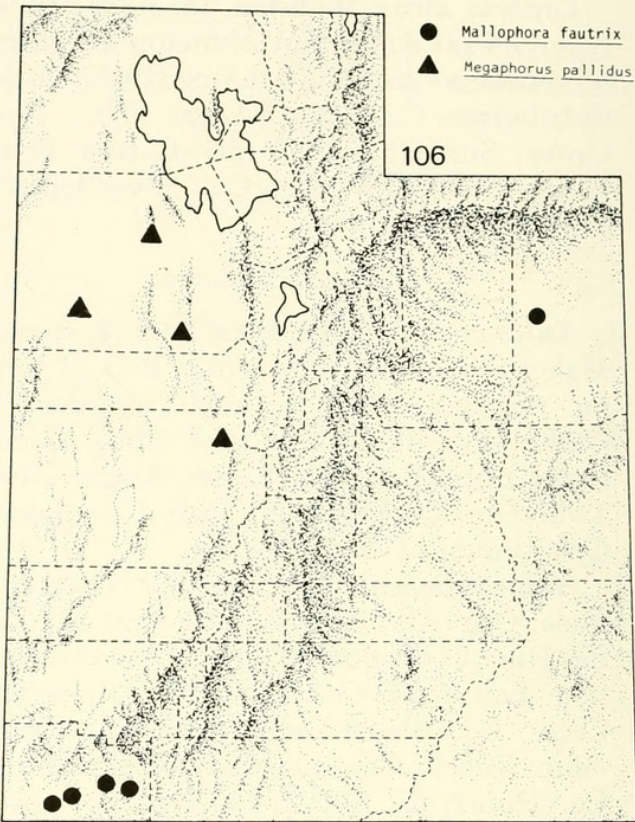
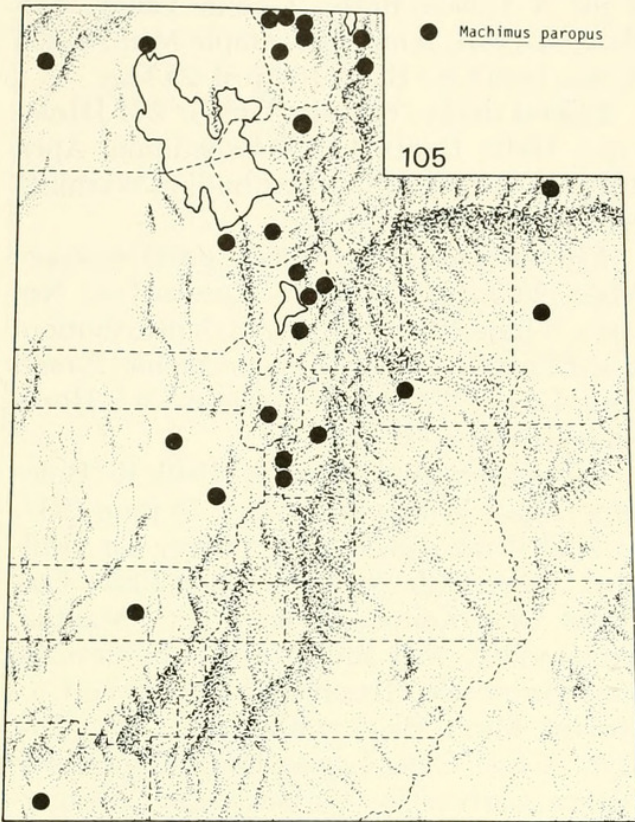
Efferia albibarbis (Macquart) 1838: 118 [Holotype: Sex not known, 'North America,' repository not found]. Utah distribution: Cache Co.: Cornish, Logan, Paradise, Wellsville; Duchesne Co.: Myton; Emery Co.: Green River, Woodside; Garfield Co.: Henrieville, Ten Mile (Escalante Desert); Grand Co.: Arches, Castleton, Castle Valley, La Sal Mtns., Moab; Juab Co.: Trout Cr.; Millard Co.: Delta, Fillmore; San Juan Co.: Bluff; Tooele Co.: Little Granite Mtns.; Uintah Co.: Fort Duchesne, Maeser; Utah Co.: east side Utah Lake, Provo; Washington Co.: Leeds, Pinto, Rockville, Santa Clara, Snow Cyn., St. George, Zion National Park—Coalpits Wash, Narrows; Wayne Co.: Notom; Weber Co.: Hooper, Riverdale. 7 May–1 August.

Efferia apache Wilcox 1966a: 141 [Holotype: Male, Chambers, Arizona, 18 May 1965, in CAS]. Utah distribution: Emery Co.: 4 mi N Gilson Butte, Goblin Valley, San Rafael Desert, 3 mi SSE Temple Mtn., 5,300 ft; San Juan Co.: Bluff. 16 April–29 May.

Efferia arida (Williston) 1893: 254 [Holotype: Male, Death Valley Expedition, April 1891, in USNM]. Utah distribution: Washington Co.: Leeds. 4–23 April.

Efferia basini Wilcox 1966a: 190 [Holotype: Male, 28.5 mi W Eureka, Eureka Co., Nevada, 6 June 1960, in CIS]. Utah distribution: Box Elder Co.: Cedar Cr., Snowville; Grand Co.: 12 mi NW Moab; Wayne Co.: Horse Valley. 28 May–19 June.

Efferia benedicti (Bromley) 1940: 15 [Holotype: Male, Winslow, Arizona, 13 June 1937, in KU]. Utah distribution: Beaver Co.: Milford, Minersville Reservoir; Box Elder Co.: Clear Cr., Kelton, Lampo Jct., Mantua, Promontory, Raft River Mtns., Rattlesnake Pass, Snowville, Tecoma Range; Cache Co.: Beaver Mtn., Blacksmith Fork Cyn., Dry Cyn., Green Cyn., Logan, Logan Cyn., Providence; Carbon Co.: Carbon Airport, Drager-ton, Kennilworth, Price, Woodhill; Davis Co.: Antelope Island, Farmington; Daggett Co.: Bridgeport; Duchesne Co.: Duchesne; Emery Co.: Buckskin Springs, Block Mtn., 4 mi N Gilson Butte, Sinbad Country; Garfield Co.: Boulder, 11 mi E Escalante, Escalante Desert, Halls Cr., Long Hollow, Shitamaring Cyn., Ten Mile, Willow Tanks; Grand Co.: Castle Valley, Moab; Iron Co.: Cedar City, Parowan; Juab Co.: Antelope Springs, Callao, Deep Cr. Mtns., Levan, Thomas Range, Topaz Mtn., Trout Cr., Utah Agricultural Experiment Station north of Levan; Kane Co.: Glendale, Kanab, Kodachrome Basin, Zion National Park; Millard Co.: Confusion Pass, Delta, Fillmore, Flowell, Garrison, Hatton, Oak City, Pahvant, Scipio Lake; Piute Co.: Marysvale; Salt Lake Co.: Dry Cyn., Fort Douglas, Salt Lake City; San Juan Co.: Blanding, Hite, Kane Springs, Lime Cr., Monticello, Bluff, Monument Valley, Natural Bridges National Monument, Navajo Mtn. Trading Post; Sanpete Co.: 8 mi NE Fountain Green; Sevier Co.: Fish Lake, Fremont Jct., Gooseberry, Richfield; Tooele Co.: Cedar Mtns., Clifton, Delle, Dugway Mtns., between Johnson and Douglas passes, Lookout Mountain, Skull Valley, Simpson Springs,



Figs. 105–108. Utah Asilidae, distribution: 105, *Machimus paropus*; 106, *Mallophora faultrix* and *Megaphorus pallidus*; 107, *Megaphorus frustra* and *Megaphorus pulcher*; 108, *Megaphorus willistoni* and *Megaphorus guildiana*.

Stansbury Island, Timpie, Wendover; Uintah Co.: Dinosaur National Monument, Evacuation Cr., Vernal; Utah Co.: Alpine, Aspen Grove, Cedar Valley, Goshen, Oquirrh Mtns., Payson, Provo, Rock Cyn., Spanish Fork, West Cyn., west Utah Lake, Y Mtn.; Washington Co.: Beaver Dam Mtns., Dixie National Forest, Hurricane, Ivins, Leeds Cyn., St. George, Summit, Toquerville, Veyo, Zion National Park; Wayne Co.: Experiment Station, Fruita, Grover, Hanksville, Notom, Torrey, 6 mi W Torrey; Weber Co.: Farr West, North Ogden, Ogden. 23 April–28 August.

Efferia bicolor (Bellardi) 1861: 47 [Holotype: Male, 'Mexico,' repository not listed in Wilcox (1966)]. Utah distribution: Box Elder Co.: Kelton; Cache Co.: Logan; Daggett Co.: Bridgeport, Hideout Cyn.; Iron Co.: Cedar City; Juab Co.: Trout Cr.; Washington Co.: Zion National Park. 19 July–24 July.

Efferia cana (Hine) 1916: 22 [Syntypes: Males and females, Claremont, California, in OSU]. Utah distribution: Juab Co.: Fish Springs; Kane Co.: Wahweep Va.; Millard Co.: Delta; Utah Co.: Provo; Washington Co.: 15 mi SW Shivwits, Hurricane, La Verkin, Leeds, Pintura, Santa Clara, St. George, 3 mi N St. George; Wayne Co.: Hanksville. 23 April–1 June.

Efferia costalis (Williston) 1885: 64 [Holotype: None listed]. Utah distribution: Box Elder Co.: Curlew Valley; Cache Co.: Franklin Basin; Carbon Co.: Price; Daggett Co.: Elk Park; Duchesne Co.: Yellowstone Ranger Station; Garfield Co.: Bryce Cyn., Daves Hollow, Panguitch Lake; Iron Co.: Kanarraville; Kane Co.: Coral Pink Sand Dunes; Millard Co.: Antelope Mtn.; Rich Co.: Sage Cr. Jct.; Salt Lake Co.: Parleys Cyn.; San Juan Co.: Blanding; Tooele Co.: James Ranch—Government Spring; Washington Co.: New Harmony. 9 June–7 August.

Efferia davis Wilcox 1966a: 132 [Holotype: Male, 12 mi N Sasabe, Arizona, 5 August 1962, in CAS]. Utah distribution: Washington Co.: Ivins, Leeds, Rockville, Santa Clara, Zion National Park. 15–19 July.

Efferia deserti Wilcox 1966a: 199 [Holotype: Male, 10 mi E Desert Center, California, 13 April 1941, in CAS]. Utah distribution: Washington Co.: Santa Clara, St. George, Zion National Park. 4–15 May.

Efferia frewingi Wilcox 1966a: 169 [Holo-

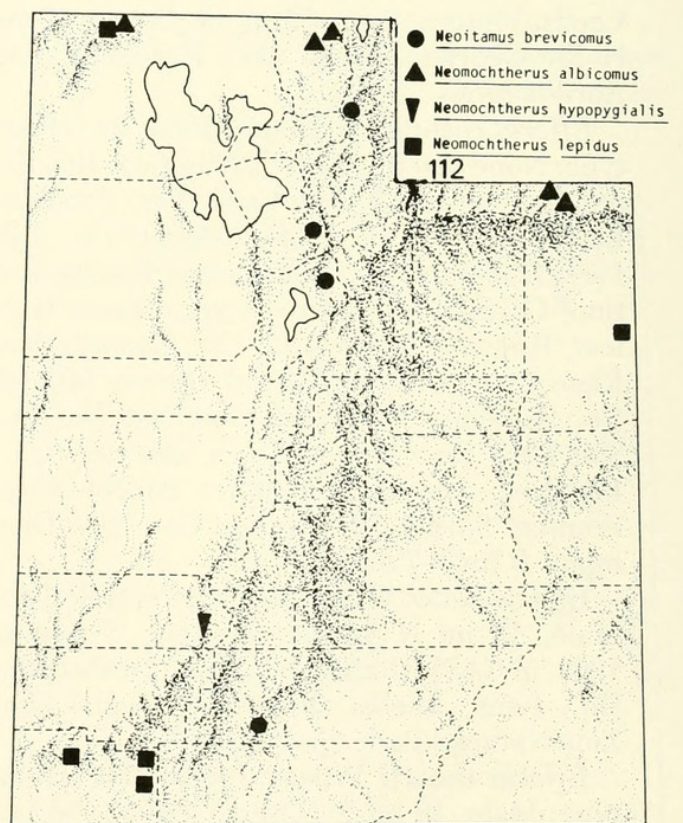
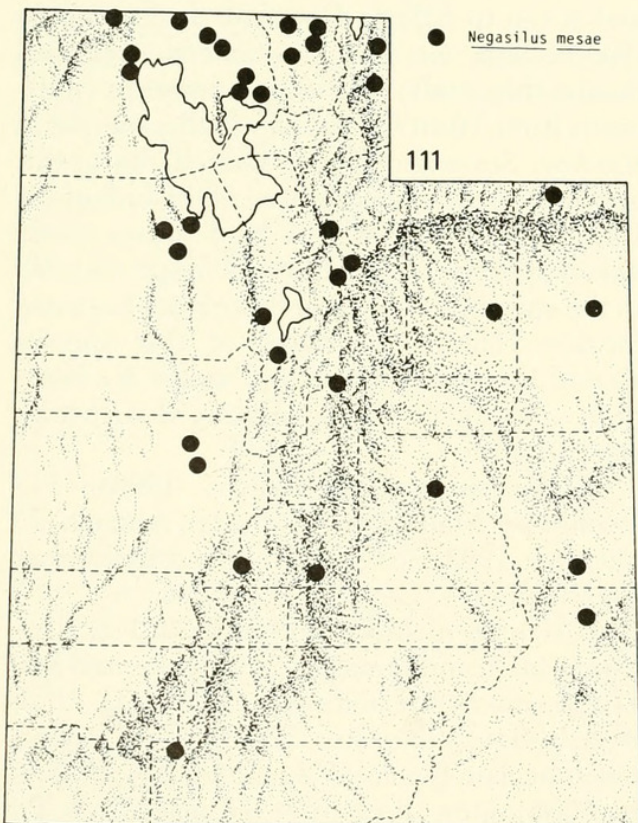
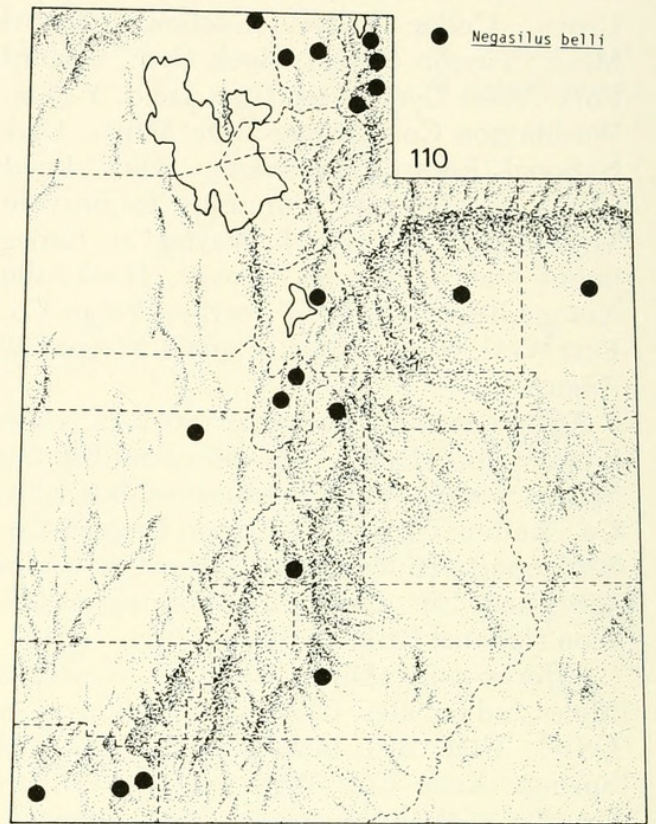
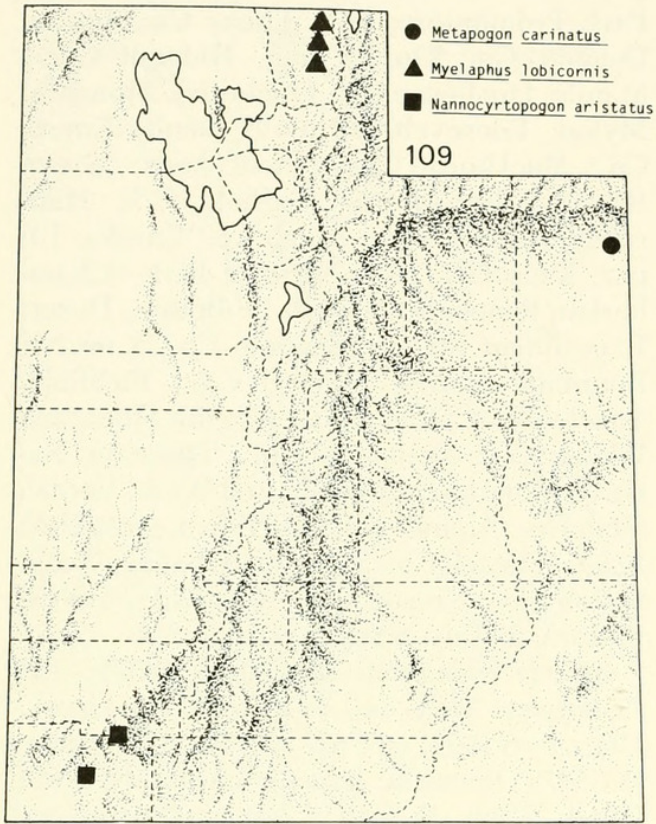
type: Male, Antelope Mtn., Harney Co., Oregon, 6,500 ft, 9 August 1931, in CAS]. Utah distribution: Box Elder Co.: Clear Cr., Kelton Pass, Promontory, Yost; Cache Co.: Logan; Daggett Co.: Dutch John, Hideout Cyn., Manila; Duchesne Co.: Duchesne, Monarch, Myton, Roosevelt, 10 mi N Neola; Emery Co.: Buckhorn Flats, fossil beds, Green River, Gilson Butte; Garfield Co.: Henrieville, Henry Mtns.; Juab Co.: Eureka, Topaz; Kane Co.: Zion National Park—Chamberlain Ranch; Millard Co.: Fillmore, Desert Experiment Station; Sanpete Co.: 8 mi NE Fountain Green; Sevier Co.: Richfield; Tooele Co.: Clifton, Little Granite Mountain; Uintah Co.: Diamond Mtn., Dinosaur National Monument, Jensen, Red Wash, Vernal; Utah Co.: Alpine, Goshen, Provo, west Utah Lake; Wasatch Co.: Strawberry Valley; Washington Co.: Crystal Cr., Hurricane, Leeds, Pintura. 26 July–8 September.

Efferia knowltoni (Bromley) 1937b: 104 [Syntypes: Male and female, Trout Creek, Utah, 5–6 1934, in USU or USNM (not seen at USU)]. Remarks: A specimen labeled Trout Creek, Utah, 5–6 1934 but without a type label in the USU collection was examined, and it ran to *Efferia benedicti* in the Wilcox (1966a) key. No male specimens examined during this study, including numerous specimens from Trout Creek, ran to this species in the key. Some females do indeed run to this species based on the position of the fork of the third vein (in the Wilcox key). Upon closer observation this character was found variable in the specimens, even in those from the same locality. Therefore, status of this species should be that of synonymy under *E. benedicti* until characters separating this species can be found.

Efferia mortensoni Wilcox 1966a: 173 [Holotype: Male, 2 mi NE Portal, Arizona, 23 October 1962, in CAS]. Utah distribution: Snow Cyn., St. George. 7 October.

Efferia pernicious Coquillett 1893: 175 [Syntypes: Male and female, Los Angeles and San Diego counties, California, in USNM]. Utah distribution: Kane Co.: Zion National Park—Chamberlain Ranch; Washington Co.: Boilers in Washington, Rockville—Duncan Flats. 29 July–5 September.

Efferia producta (Hine) 1919: 136 [Syntypes: Male and female, Flinn Springs, Lakeside, California, 9 August 1917, in OSU].



Figs. 109–112. Utah Asilidae, distribution: 109, *Metapogon carinatus*, *Myelaphus lobicornis*, and *Nannocyrtopogon aristatus*; 110, *Negasilus belli*; 111, *Negasilus mesae*; 112, *Neoitamus brevicornis*, *Neomochtherus albicomus*, *Neomochtherus hypopygialis*, and *Neomochtherus lepidus*.

Utah distribution: Kane Co.: Kanab; San Juan Co.: Navajo Mtn.; Washington Co.: Zion National Park. 17 July–28 August.

Efferia staminea (Williston) 1885: 68 [Holotype: Male, Montana, in KU]. Utah distribution: Daggett Co.: Pipe Creek. 6 August.

Efferia subarida (Bromley) 1940: 14 [Holotype: Types—male and female, Tucson, Arizona, 8 March 1937, in KU]. Utah distribution: Garfield Co.: Shitamaring Cyn. 18 May.

Efferia subcuprea (Schaeffer) 1916: 66 [Holotype: Male, Prescott, Arizona, in USNM]. Utah distribution: Beaver Co.: Beaver; Box Elder Co.: Willard Basin; Garfield Co.: Aquarius Plateau; Grand Co.: Moab; Iron Co.: Parowan; Kane Co.: Paria River; San Juan Co.: Kane Springs; Tooele Co.: Little Granite Mtn.; Utah Co.: Provo Cyn.; Washington Co.: Zion National Park. 29 June–29 August.

Efferia subpilosa (Schaeffer) 1916: 67 [Holotype: Male, Beaver Creek Hills, Beaver Co., Utah, in USNM]. Remarks: Wilcox (1966a) sensed problems with respect to the identity of this species. Apparently no specimens which he studied could confidently be placed in this species. I have not seen any specimens which would fit the descriptions outlined by the Wilcox (1966a) key. The type should be examined to determine the status of this species.

Efferia tucsoni Wilcox 1966a: 231 [Holotype: Male, Portal, Arizona, 23 July 1963, in CAS]. Utah distribution: Garfield Co.: Shitamaring Cyn.; San Juan Co.: Natural Bridges National Monument; Washington Co.: Leeds Cyn., Paradise Cyn. (near Ivins), Santa Clara, Zion National Park. 14–27 July.

Efferia utahensis (Bromley) 1937b: 103 [Holotype: Male, Price, Utah, 26 August 1935, in USU or USNM (not seen at USU)]. Utah distribution: Carbon Co.: 1 mi S Price; Emery Co.: 2 air mi W Little Gilson Butte, Goblin Valley (in wash), 4 air mi N Gilson Butte; Garfield Co.: Henry Mtns., Wickiup Pass; Grand Co.: Westwater; San Juan Co.: 8 mi NE Mexican Hat. 15 August–17 September.

Efferia willistoni (Hine) 1919: 110 [Syntypes: Male and female, Williams, Arizona, 21 July, in USNM]. Utah distribution: Cache Co.: Green Cyn., Logan Cyn.; Grand Co.: Castleton, La Sal Mtns.; Millard Co.: Cove Fort, Fillmore; Salt Lake Co.: Magna, Salt

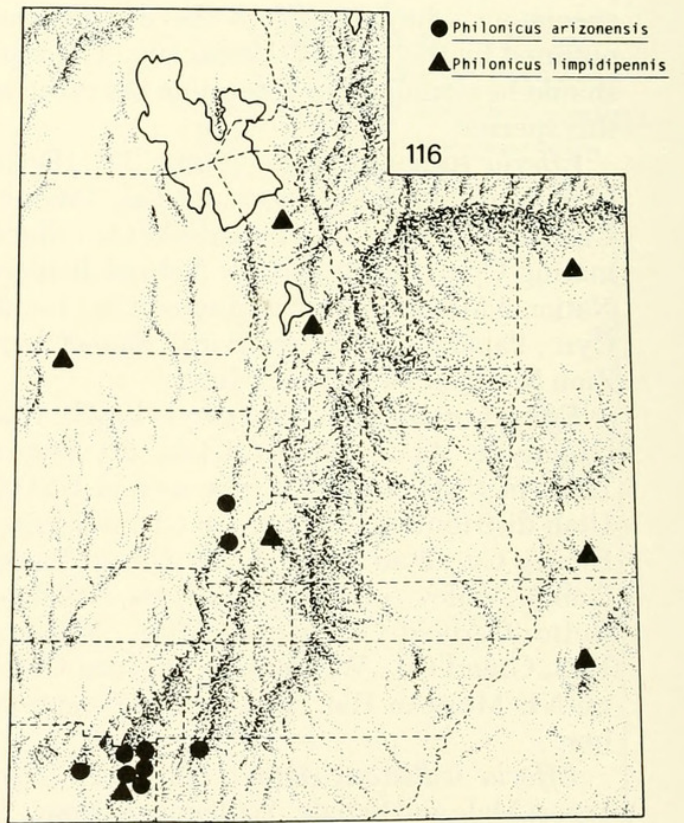
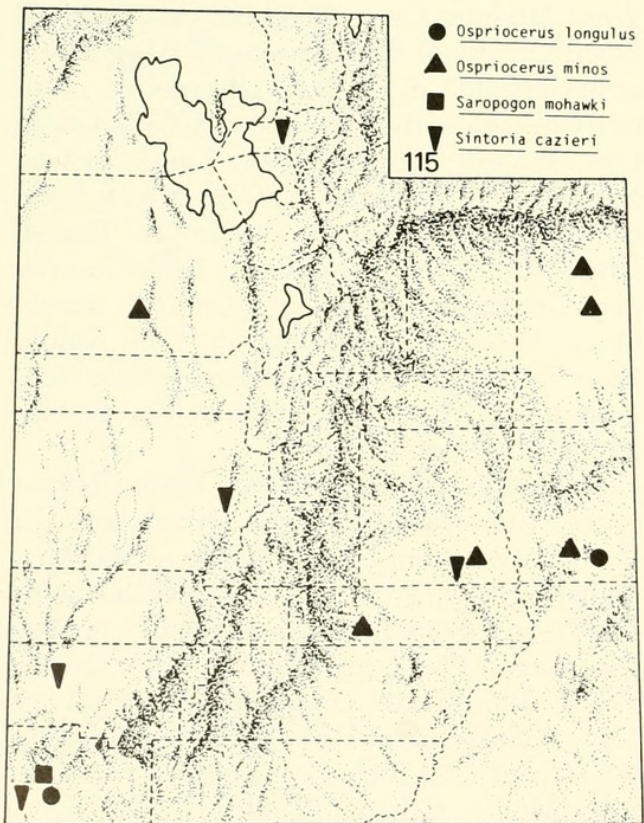
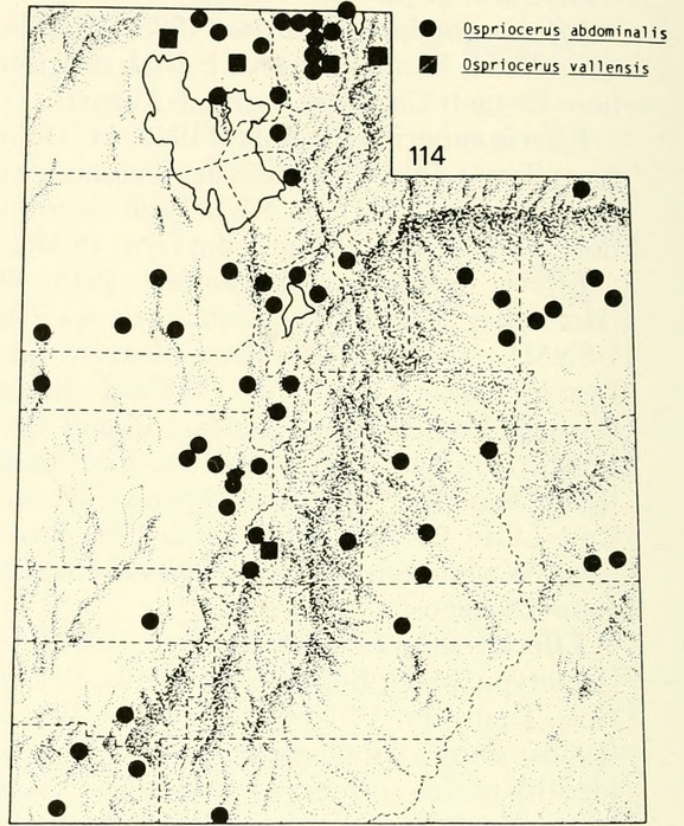
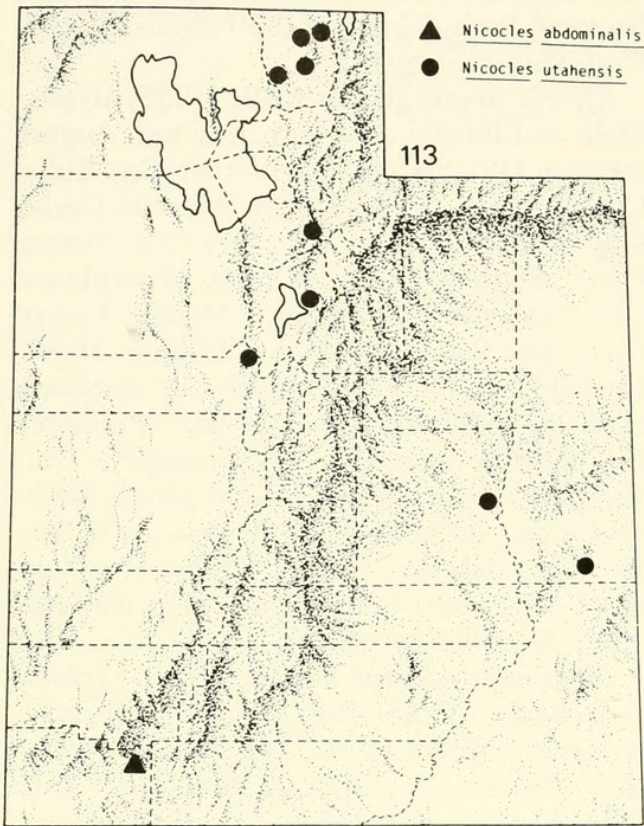
Lake City; San Juan Co.: Grand Gulch, Natural Bridges National Monument; Washington Co.: Crystal Cr., Deep Cr., Leeds Cyn., Zion National Park—Court of the Patriarchs, Oak Cr. 6 May–6 August.

Efferia zonata (Hine) 1919: 112 [Syntypes: Male and female, southern Arizona, August 1902, in OSU]. Utah distribution: Box Elder Co.: Clear Cr., 5 mi N Kelton, Mantua; Cache Co.: Blacksmith Fork Cyn., Dry Cyn., Green Cyn., Hatties Grove, Logan, Providence Cyn.; Daggett Co.: 14 mi S Manila; Emery Co.: San Rafael Reef, S. Temple Wash; Garfield Co.: Henrieville; Juab Co.: Antelope Springs; Millard Co.: Delta, Fillmore, Gandy; San Juan Co.: Hite; Sanpete Co.: Ephraim; Tooele Co.: Deep Cr. Mtns., Hickman Cyn., Johnson Pass, Mercur, Whiskey Springs; Utah Co.: Payson, Provo; Washington Co.: Leeds, Snow Cyn., Zion National Park. 30 June–28 August.

Machimus adustus Martin 1975: 27 [Holotype: Male, White Mtns., Bee Hive Springs, Arizona, 18 July 1949, in CAS]. Utah distribution: Beaver Co.: Milford; Box Elder Co.: Clear Cr., Mantua; Cache Co.: Green Cyn., Logan, Logan Cyn., Tony Grove, Twin Cr., West Hodges Cyn.; Daggett Co.: 4 mi E Deep Cr., Pipe Creek Summit Ranger Station; Garfield Co.: Boulder, Bryce Cyn.; Millard Co.: Delta; Rich Co.: Garden City, Logan Cyn. summit; San Juan Co.: Kane Springs, Navajo Mtn.; Sanpete Co.: Centerfield; Summit Co.: 16 mi 'P' Kamas; Tooele Co.: Tooele; Uintah Co.: Whiterocks Cyn.; Utah Co.: Aspen Grove; Wasatch Co.: Keetley, Strawberry Reservoir; Washington Co.: Kolob, Pine Valley, Zion National Park—East Rim, Lava Point; Weber Co.: Huntsville, Uintah. 20 June–18 September.

Machimus callidus Williston 1893: 75 [Syntypes: Male and female, Mt. Hood, in KU]. Utah distribution: Box Elder Co.: Clear Cr., Willard Basin, Yost; Cache Co.: Blacksmith Fork Cyn., Franklin Basin, Green Cyn., Logan, Logan Cyn., Providence, Tony Grove, White Pine Lake; Daggett Co.: Hideout Cyn., Manila; Grand Co.: Castle Valley; Juab Co.: Trout Cr.; Rich Co.: Logan Cyn. summit, Monte Cristo, Walton (Allen) Cyn.; Tooele Co.: Vernon; Uintah Co.: Jensen; Washington Co.: Zion National Park. 6 May–10 September.

Machimus griseus Hine 1906: 29 [Syntypes:



Figs. 113–116. Utah Asilidae, distribution: 113, *Nicocles abdominalis* and *Nicocles utahensis*; 114, *Ospriocerus abdominalis* and *Ospriocerus vallisensis*; 115, *Ospriocerus longulus*, *Ospriocerus minos*, *Saropogon mohawki*, and *Sintoria cazieri*; 116, *Philonicus arizonensis* and *Philonicus limpipedennis*.

Male and female, 'Southwestern Colorado,' no repository listed]. Utah distribution: Cache Co.: Blacksmith Fork Cyn.; Daggett Co.: Manila; Grand Co.: Castleton; Juab Co.: Callao; Kane Co.: Kanab; San Juan Co.: Natural Bridges National Monument; Uintah Co.: Fort Duchesne, Whiterocks; Utah Co.: Hobbie Cr. Cyn.; Washington Co.: Boilers—Washington, Crystal Cr., Deep Cr., Leeds, Zion National Park—Court of the Patriarchs; Wayne Co.: Grover. 10 July–12 September.

Machimus occidentalis (Hine) 1909: 147 [Type: None designated, several specimens, noted by Hine (1909) from B.C., Nevada, California, Oregon, and Washington]. Utah distribution: Box Elder Co.: Clear Cr., Curlew Valley, Hansel Valley, Mantua, Raft River Mtns.; Cache Co.: Ant Valley, Blacksmith Fork Cyn., Green Cyn., Logan Cyn., Providence, Tony Grove, Twin Creek; Grand Co.: La Sal Mtns.; Juab Co.: Trout Cr.; Millard Co.: Delta, Holden; Rich Co.: Logan Cyn. summit; San Juan Co.: 25 mi S Moab; Uintah Co.: Jensen; Utah Co.: South Fork of Provo Cyn.; Washington Co.: Leeds, Pine Valley, Zion National Park; Weber Co.: Ogden. 3 June–25 July.

Machimus paropus (Walker) 1849: 455 [Holotype: Not listed in Hine (1909)]. Utah distribution: Beaver Co.: Milford; Box Elder Co.: Grouse Cr., 25 mi SW Snowville; Cache Co.: Clarkston, Cornish, Mendon, Petersboro, Richmond, Smithfield Cyn.; Carbon Co.: Helper; Daggett Co.: Manila; Juab Co.: Chicken Cr. Reservoir; Millard Co.: Delta, Fillmore; Rich Co.: Laketown, Randolph; Salt Lake Co.: Midvale; Sanpete Co.: Centerfield, Ephraim, Fayette, Sanpete; Tooele Co.: Mills Jct.; Uintah Co.: Fort Duchesne; Utah Co.: American Fork, Provo, South Fork of Provo Cyn., Spanish Fork; Washington Co.: St. George; Weber Co.: Huntsville. 6 May–2 September.

Machimus sestertius Martin 1975: 29 [Holotype: Male, 4.5 mi E Moenkopi, Coconino Co., Arizona, 14 July 1966, in CAS]. Utah distribution: Kane Co.: Coral Pink Sand Dunes, Kanab, 10 mi N Kanab; Tooele Co.: Dugway Proving Grounds; Washington Co.: Crystal Cr., Deep Cr., Santa Clara, St. George, Zion National Park. 13 May–21 September.

Mallophora faultrix Osten Sacken 1877: 191 [Holotype: Presidio, Mexico, no sex or repository listed].

Utah distribution: Uintah Co.: Randlett (?); Washington Co.: La Verkin, St. George, Washington, Zion National Park. 4 July–15 August.

Megaphorus frustra (Pritchard) 1935: 11 [Holotype: Male, Tem (south of Whitewater), Arizona, 19 August 1934, in AMNH]. Utah distribution: Garfield Co.: Cass Cr. Reservoir; Iron Co.: Cedar City, Iron Springs, Parowan; Kane Co.: Kanab; Millard Co.: Chalk Cr., Leamington; San Juan Co.: Blanding, Monticello; Tooele Co.: Cedar Mtns.; Washington Co.: Anderson Jct., Ash Cr., Gunlock, Leeds Cyn., Little Pinto, Pintura, Utah State Line U 59, Zion National Park. 14 June–26 August.

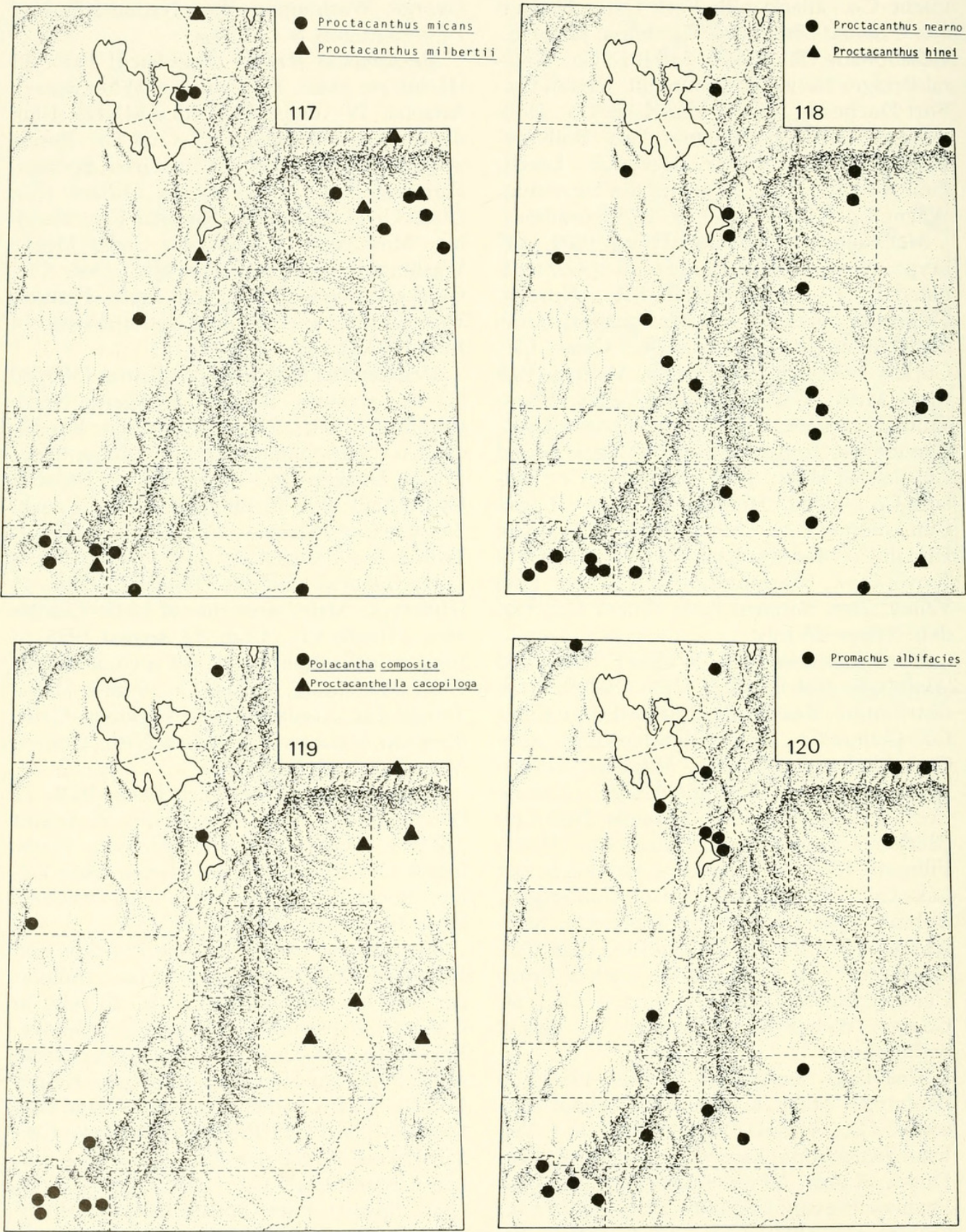
Megaphorus guildiana (Williston) 1885: 60 [Types: western Kansas, Montana, North Carolina, in KU]. Utah distribution: Box Elder Co.: Snowville; Cache Co.: Green Cyn., Logan; Daggett Co.: Forest Camp, Hideout Cyn.; Juab Co.: Nephi; Kane Co.: Kanab; Sanpete Co.: Fairview; Uintah Co.: La Point, Tridell. 5–23 August.

Megaphorus pallidus (Johnson) 1958: 41 [Holotype: Male, west side of Little Granite Mtn., Tooele Co., Utah, 21 August 1955; in Johnson collection (paratypes seen at BYU)]. Utah distribution: Millard Co.: 9 mi E Delta; Tooele Co.: Cedar Mtns., Hickman Cyn., Simpson Mtns., west side of Little Granite Mtn. 23 July–21 August.

Megaphorus pulcher (Pritchard) 1935: 11 [Holotype: Carlsbad, New Mexico, 29 August 1934, in AMNH]. Utah distribution: Washington Co.: Enterprise, Middleton, Pine Valley, Rockville, St. George, Zion National Park. 10 August–14 October.

Megaphorus willistoni (Cole,) in Cole and Pritchard 1964: 74 [Holotype: Male, Hallelujah Jct., Lassen Co., California, 26 July, in CAS]. Utah distribution: Beaver Co.: Beaver; Box Elder Co.: Clear Cr.; Cache Co.: Blacksmith Fork Cyn., Green Cyn., Logan; Emery Co.: Block Mtn., Sinbad Country; Grand Co.: Moab; Millard Co.: Fillmore; Salt Lake Co.: Salt Lake City; Sanpete Co.: 8 mi NE Fountain Green; Utah Co.: BYU, Provo, Rock Cyn., Spanish Fork, Spring Lake; Washington Co.: Zion National Park. 8–24 August.

Negasilus belli Curran 1934: 184 [Holotype: None listed]. Utah distribution: Box Elder Co.: Portage; Cache Co.: Logan, Mendon; Duchesne Co.: Duchesne; Garfield Co.:



Figs. 117–120. Utah Asilidae, distribution: 117, *Proctacanthus micans* and *Proctacanthus milbertii*; 118, *Proctacanthus nearno* and *Proctacanthus hinei*; 119, *Polacantha composita* and *Proctacanthella cacopiloga*; 120, *Promachus albifacies*.

Boulder; Juab Co.: Chicken Cr., Nephi; Millard Co.: Delta; Rich Co.: Laketown, Randolph, Walton (Allen) Cyn., Woodruff; Sanpete Co.: Fairview; Sevier Co.: Koosharem Reservoir; Uintah Co.: Vernal; Utah Co.: Provo; Washington Co.: Santa Clara, Virgin, Zion National Park. 13 June–23 July.

Negasilus mesae (Tucker) 1907: 51 [Holotype: Colorado Springs, Colorado, in KU]. Utah distribution: Box Elder Co.: Bird Refuge, Blue Cr., Brigham City, Corinne, Howell, Kelton, Locomotive Springs, Nafton, Snowville; Cache Co.: Beaver Mtn., Benson, Cornish, Logan Cyn.—Twin Cr.; Daggett Co.: Manila; Duchesne Co.: Myton; Emery Co.: 9 air mi E Castledale, Sinbad Country east of Block Mtn.; Grand Co.: Moab; Kane Co.: Navajo Lake; Millard Co.: Delta, Pahvant; Rich Co.: Sage Cr. Jct., Woodruff; San Juan Co.: Kane Springs; Sanpete Co.: Indianola; Sevier Co.: Fish Lake, Sevier; Summit Co.: Park City; Tooele Co.: Delle, Iosepa, Timpie; Uintah Co.: Jensen; Utah Co.: Elberta, Fairfield; Wasatch Co.: Heber, Provo Cyn. 18 May–12 August.

Neoitamus brevicornis (Hine) 1909: 155 [Syntypes: Male and female, Kalso, B.C., repository not listed]. Utah distribution: Garfield Co.: Long Hollow; Rich Co.: Monte Cristo; Salt Lake Co.: Mill Creek Ranger Station; Utah Co.: Aspen Grove. 12 July–11 August.

Neomochtherus albicomus (Hine) 1909: 136 [Syntypes: Male and female, Montana, in USNM]. Utah distribution: Box Elder Co.: Clear Cr.; Cache Co.: Green Cyn., Twin Cr.; Daggett Co.: Hideout Cyn., Manila. 19 July–4 September.

Neomochtherus hypopygialis (Schaeffer) 1916: 68 [Syntypes: Two males, Beaver Cyn., Utah, in AMNH]. Remarks: No specimens of this species were seen in collections during this study.

Neomochtherus lepidus (Hine) 1909: 136 [Holotype: Male, Colorado, also female, White Mtns. of New Mexico about 6,000 ft, 23 July, in USNM]. Utah distribution: Box Elder Co.: Clear Cr.; Uintah Co.: Bonanza; Washington Co.: Pine Valley, Zion National Park. 24 August.

Philonicus arizonensis (Williston) 1893: 76 [Holotype: Female, Arizona, in KU]. Utah distribution: Kane Co.: Long Valley; Millard Co.: Fillmore, Kanosh Cyn.; Washington

Co.: Crystal Cr., Deep Cr., Leeds Cyn., Rockville, Zion National Park—Birch Cr., Coalpits Wash, Court of the Patriarch, Narrows, Taylor Cr. 17 June–28 August.

Philonicus limpidipennis (Hine) 1909: 167 [Syntypes: Male and female, southwestern Colorado, 14 July 1899, repository not listed]. Utah distribution: Grand Co.: Moab; Juab Co.: Callao; Salt Lake Co.: Salt Lake City; San Juan Co.: Indian Cr.; Sevier Co.: Richfield; Uintah Co.: Vernal Refuge; Utah Co.: Spanish Fork; Washington Co.: Rockville. 18 June–30 August.

Polacantha composita (Hine) 1918: 321 [Holotype: Male, San Diego, California, 30 June 1913, in Hine Collection]. Utah distribution: Cache Co.: Logan; Iron Co.: Cedar City; Juab Co.: Trout Cr.; Utah Co.: Saratoga; Washington Co.: Leeds, Leeds Cyn., Paradise Cyn., St. George, Virgin, Zion National Park. 27 June–28 August.

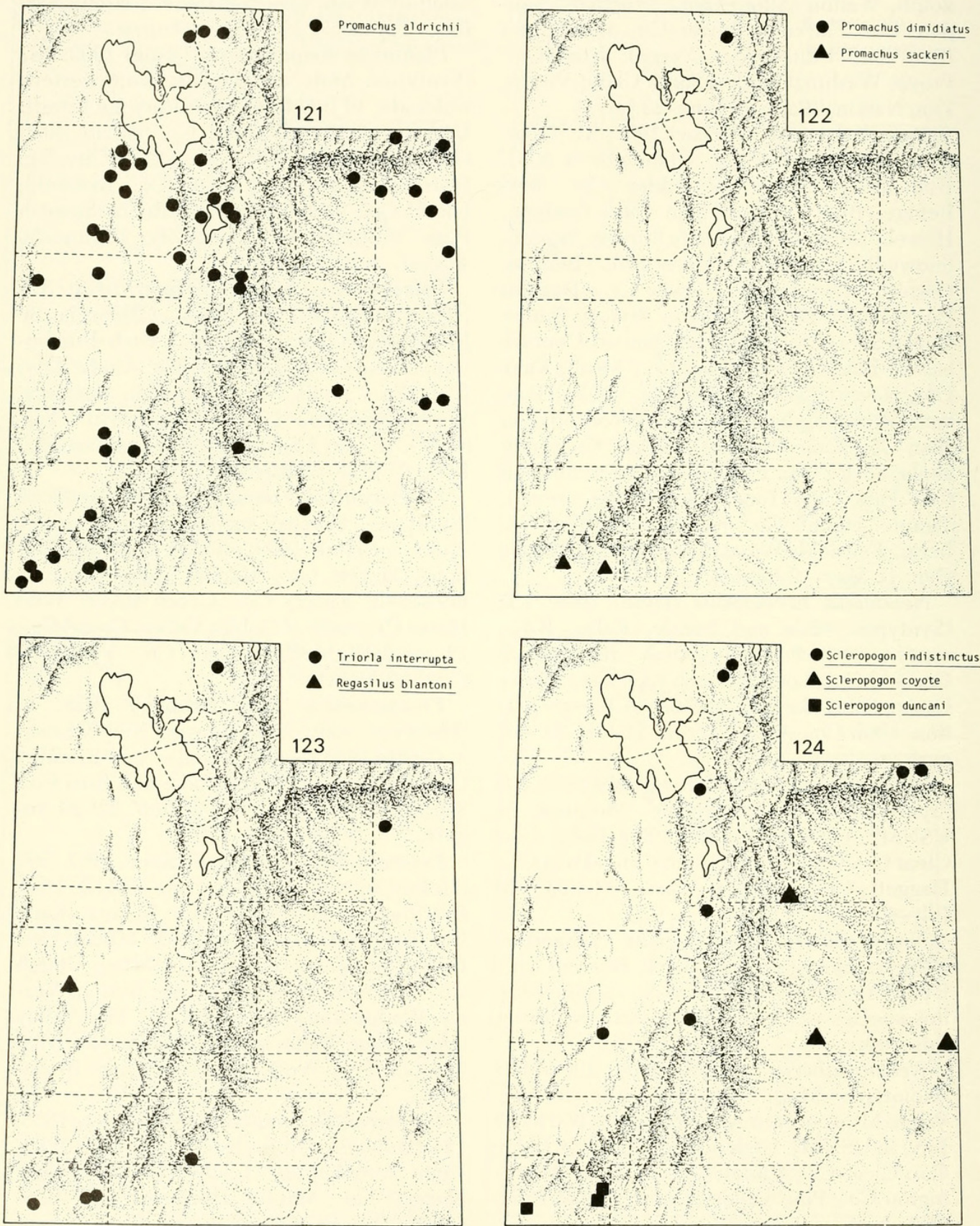
Proctacanthella cacopiloga (Hine) 1909: 65 [Syntypes: Several specimens from many states, see Hine (1909), in KU]. Utah distribution: Daggett Co.: Manila; Duchesne Co.: Roosevelt; Emery Co.: Green River, Wild Horse Cr. north of Goblin Valley; Grand Co.: 12 mi NW Moab; Uintah Co.: Vernal. 6 June–16 August.

Proctacanthus hinei Bromley 1928: 13 [Holotype: male, Albuquerque, New Mexico, 3 August 1925, S. W. Bromley., in Bromley Collection]. Utah distribution: San Juan Co.: Sand Island Cmpgd. 2 mi S Bluff. 22–23 August.

Proctacanthus micans Schiner 1867: 397 [Holotype: None listed in Hine (1911)]. Utah distribution: Duchesne Co.: Boneta; Kane Co.: Kanab, Zion National Park; Millard Co.: Delta; San Juan Co.: Navajo Mtn.; Uintah Co.: Bonanza, Fort Duchesne, Jensen, Vernal; Washington Co.: Leeds Cyn., Pine Valley Cmpg, Zion National Park; Wayne Co.; Weber Co.: Farr West, Ogden. 15 July–19 August.

Proctacanthus milberti Macquart 1838: 124 [Holotype: None listed in Hine (1911)]. Utah distribution: Cache Co.: Cornish; Daggett Co.: Manila; Duchesne Co.: Roosevelt; Uintah Co.: Vernal; Utah Co.: Goshen; Washington Co.: Zion National Park. 27 June–11 August.

Proctacanthus nearno Martin 1962: 187 [Holotype: Male, Baboquivari Mtns., Ari-



Figs. 121–124. Utah Asilidae, distribution: 121, *Promachus aldrichii*; 122, *Promachus dimidiatus* and *Promachus sackeni*; 123, *Triorla interrupta* and *Regasilus blantoni*; 124, *Scleropogon indistinctus*, *Scleropogon coyote*, and *Scleropogon duncani*.

zona, 19 July 1950, in KU]. Utah distribution: Cache Co.: Cornish; Carbon Co.: Price; Daggett Co.: Bridgeport; Duchesne Co.: Bluebell, Uintah Cyn.; Emery Co.: Wildhorse Cr. north of Goblin Valley, 4 mi N Gilson Butte, 2 mi E Little Gilson Butte; Garfield Co.: Boulder, Ten Mile, The Halls; Grand Co.: Castleton, Moab; Juab Co.: Callao; Kane Co.: Coral Pink Sand Dunes; Millard Co.: Delta, Fillmore; San Juan Co.: Goulding; Sevier Co.: Richfield; Tooele Co.: Skull Valley; Utah Co.: Provo, Spanish Fork; Washington Co.: Duncan Flats near Rockville, Leeds Cyn., Middleton, Rockville, Santa Clara, Shunesburg, Zion National Park—Coalpits Wash; Wayne Co.: Hanks-ville; Weber Co.: Ogden Cyn. 19 July–5 September.

Promachus albifacies Williston 1885: 63 [Holotype: Sex not known, Arizona, in KU]. Utah distribution: Box Elder Co.: Clear Cr. Cyn.; Cache Co.: Logan; Daggett Co.: Pipe Cr., Manila; Davis Co.: Wasatch Forest boundary near Bountiful; Garfield Co.: Aquarius Plateau, Escalante, Panguitch; Millard Co.: Kanosh Cyn.; Piute Co.: Junction; Tooele Co.: Lake Point; Uintah Co.: La Point; Utah Co.: American Fork, Lehi, Provo; Washington Co.: Ash Cr. bridge, Leeds Cyn., Pinto, Zion National Park; Wayne Co.: Hanks-ville. 10 June–11 August.

Promachus aldrichii Hine 1911: 171 [Syn- types: Male and female, Utah, repository not listed, probably in Hine Collection or OSU]. Utah distribution: Beaver Co.: Beaver, Mil- ford, Minersville Reservoir; Box Elder Co.: Collinston; Cache Co.: Logan, Petersboro; Daggett Co.: Bridgeport, Manila; Duchesne Co.: 10 mi N Neola; Emery Co.: Paige Flat, Sinbad Country; Grand Co.: Castle Valley, Moab; Iron Co.: Cedar City; Juab Co.: Eu- reka, Nephi, Topaz Mtn., Trout Cr.; Kane Co.: Escalante Desert, Willow Tank; Millard Co.: Confusion Pass, Desert Research Sta- tion, Pahvant; Salt Lake Co.: Hunter; San Juan Co.: Piute Pass near Grand Gulch; San- pete Co.: 8 mi NE Fountain Green, Fairview; Tooele Co.: Cedar Mtns., Delle, Dugway Proving Grounds, Flux, Hickman Cyn., In- dian Springs, Mercur, Skull Valley, Whiskey Springs; Uintah Co.: Bonanza, Dinosaur Na- tional Monument, Jensen, Vernal, White- rocks; Utah Co.: Lehi, Orem, Rock Cyn., west Utah Lake; Washington Co.: Beaver

Dam Mtns., Leeds, old airport, Paradise Cyn., Rockville, St. George, Washington, Zion National Park; Wayne Co.: Teasdale. 8 June–17 September.

Promachus dimidiatus Curran 1927: 87 [Holotype: Male, Aweme, Manitoba, July 1920, in CNC]. Utah distribution: Cache Co.: Logan. 4–20 July.

Promachus sackeni Hine 1911: 166 [Syn- types: Male and female, southern Arizona, July and August, no repository listed]. Utah distribution: Washington Co.: Leeds Cyn., Zion National Park. 4–20 July.

Regasilus blantoni Bromley 1951: 35 [Holo- type: Male, Wills (Wells?), Nevada, 19 Au- gust 1939, in Bromley Collection]. Utah dis- tribution: Millard Co.: Skull Rock Pass; Washington Co.: Beaver Dam slope near Ari- zona border. 10 September–8 October.

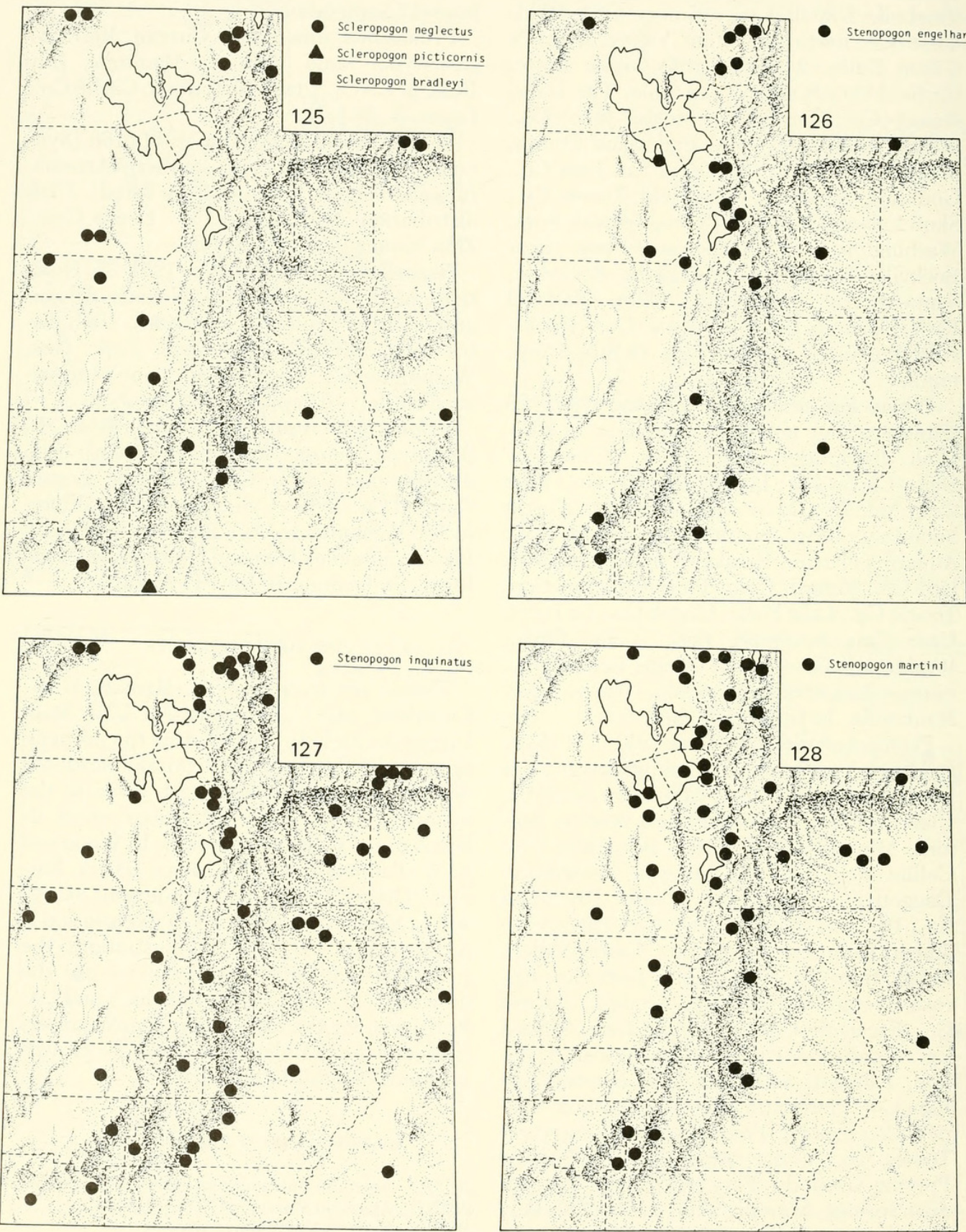
Triorla interrupta (Macquart) 1834: 310 [Holotype: Georgia, location unknown]. Utah distribution: Cache Co.: Cornish, Logan; Garfield Co.: Bryce Cyn.; Uintah Co.: White- rocks; Washington Co.: Rockville—Duncan Flats, confluence East and North forks Virgin River, St. George. 10 July–11 August.

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LIST OF MUSEUM ABBREVIATIONS

AESP	American Entomological Society, Philadelphia
AMNH	American Museum of Natural History
BYU	Brigham Young University
CAS	California Academy of Sciences
CEU	College of Eastern Utah
CIS	California Insect Survey
CNC	Canadian National Collection

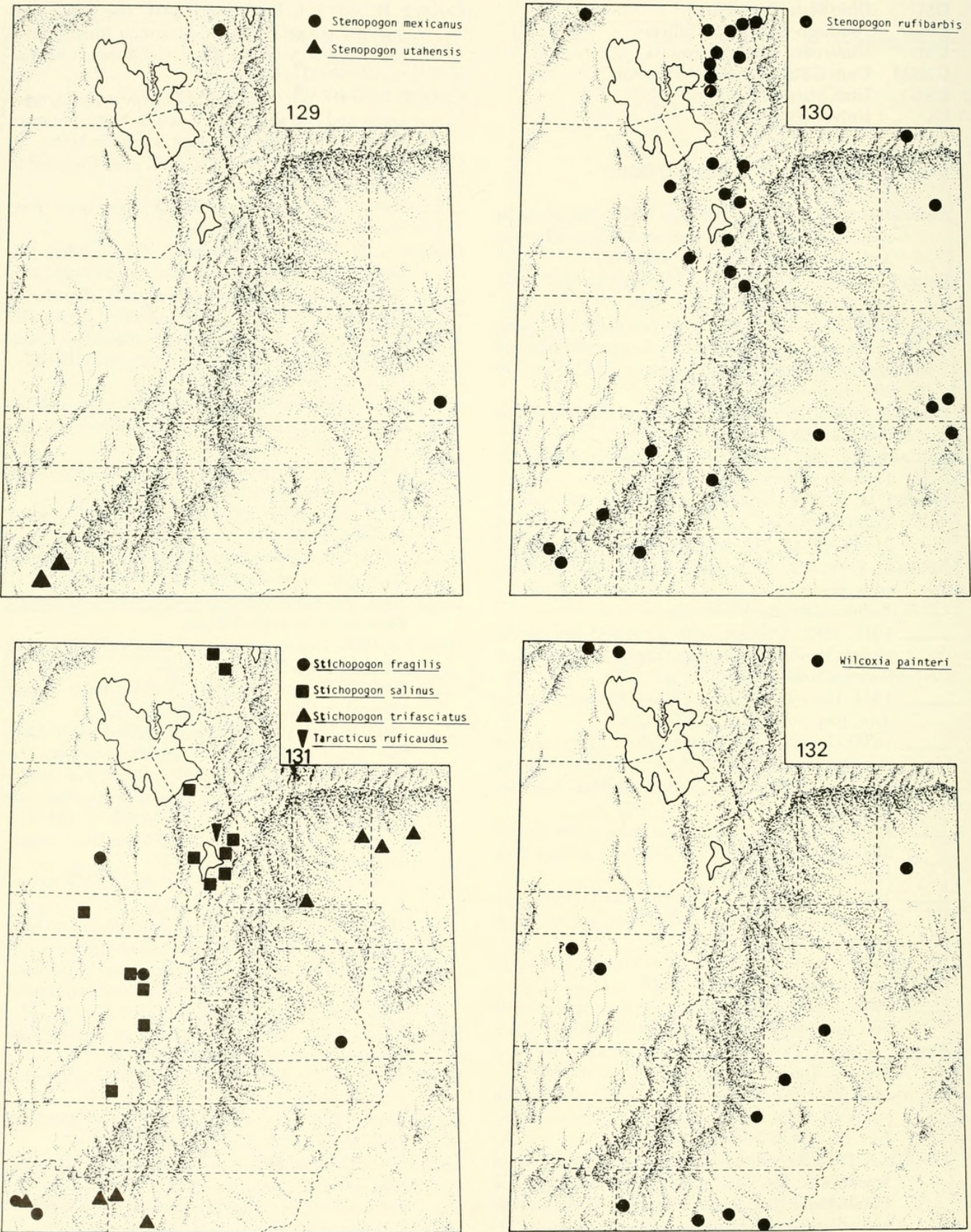


Figs. 125–128. Utah Asilidae, distribution: 125, *Scleropogon neglectus*, *Scleropogon picticornis*, and *Scleropogon bradleyi*; 126, *Stenopogon engelhardti*; 127, *Stenopogon inquinatus*; 128, *Stenopogon martini*.

CSU	Colorado State University
KU	University of Kansas
MCZ	Museum of Comparative Zoology
OSU	Ohio State University
SUSC	Southern Utah State College
UM	University of Massachusetts
USNM	United States National Museum
USU	Utah State University
UU	University of Utah

LITERATURE CITED

- ADISOEMARTO, S., AND D. M. WOOD. 1975. The Nearctic species of *Dioctria* and six related genera (Diptera: Asilidae). *Quaest. Ent.* 11: 505–576.
- BACK, E. A. 1904. New species of North American Asilidae. *Canadian Ent.* 36: 289–293.
- . 1909. The robber flies of America north of Mexico, belonging to the subfamilies Leptogastrinae and Dasypogoninae. *Trans. Amer. Ent. Soc.* 35: 137–400.
- BANKS, N. 1920. Descriptions of a few new Diptera. *Canadian Ent.* 52: 65–67.
- BELLARDI, L. 1861. Saggio di ditterologia messicana. Parte II. Torino.
- BIGOT, J. M. F. 1878. Dipteres nouveaux ou peu connus. Tribu des Asilidi. *Ann. Soc. Ent. France Ser.* 5, 8: 31–48, 40–48, 213–240, 401–446.
- BROMLEY, S. W. 1928. Notes on the genus *Proctacanthus* with descriptions of two new species (Diptera: Asilidae). *Psyche* 35: 12–15.
- . 1931. New Asilidae, with a revised key to the genus *Stenopogon* Loew: (Diptera). *Ann. Ent. Soc. Amer.* 24: 427–435.
- . 1934. The robber flies of Texas (Diptera, Asilidae). *Ann. Ent. Soc. Amer.* 27: 74–111.
- . 1936. The genus *Diognites* in the United States of America with descriptions of new species (Diptera: Asilidae). *J. New York Ent. Soc.* 44: 225–237.
- . 1937a. The genus *Stenopogon* Loew in the United States of America (Asilidae: Diptera). *J. New York Ent. Soc.* 45: 291–309.
- . 1937b. New and little-known Utah Diptera with notes on the taxonomy of the Diptera. *Proc. Utah Acad. Sci.* 14: 99–109.
- . 1940. New U.S.A. robber flies (Diptera: Asilidae). *Bull. Brooklyn Ent. Soc.* 35: 13–21.
- . 1951. Asilid notes (Diptera) with descriptions of 32 new species. *Amer. Mus. Novitates* 1532: 1–36.
- BROWN, B. 1897. Two new species of asilids from New Mexico. *Kansas Univ. Quart. Ser. A*, 6: 103.
- BROWN, C. J. D. 1929. A morphological and systematical study of Utah Asilidae (Diptera). *Trans. Amer. Ent. Soc.* 54: 295–320.
- COLE, F. R. 1923. Expedition of the California Academy of Sciences to the Gulf of California in 1921. The Bombyliidae (bee flies); Diptera from the islands and adjacent shores of the Gulf of California. II. General report. *Proc. California Acad. Sci., Ser.* 4, 12: 289–314.
- COLE, F. R., AND A. L. LOVETT. 1919. New Oregon Diptera. *Proc. California Acad. Sci., Ser.* 4, 9: 221–255.
- . 1921. An annotated list of the diptera (flies) of Oregon. *Proc. California Acad. Sci., Ser.* 4, 11: 197–344.
- COLE, F. R., AND A. E. PRITCHARD. 1964. The genus *Mallophora* and related asilid genera in North America (Diptera: Asilidae). *Univ. California Publ. Entomol.* 36: 43–100.
- COLE, F. R., AND J. WILCOX. 1938. The genera *Lasiopogon* Loew and *Alexiopogon* Curran in North America (Diptera: Asilidae). *Ent. Americana* 18: 1–90.
- COQUILLET, D. W. 1893. A new asilid genus related to *Erax*. *Canadian Ent.* 25: 175–177.
- . 1904. New North American Diptera. *Proc. Ent. Soc. Washington* 6: 166–192.
- CURRAN, C. H. 1922. New Diptera in the Canadian National Collection. *Canadian Ent.* 54: 277–287.
- . 1923a. Studies in Canadian Diptera. I. Revision of the asilid genus *Cyrtopogon* and allied genera. II. The genera of the family Blepharoceridae. *Canadian Ent.* 55: 92–95, 116–125, 132–142, 169–174, 185–190, 266–269.
- . 1923b. Apparently undescribed Canadian Asilidae and Dolichopodidae (Diptera). *Canadian Ent.* 55: 207–211.
- . 1926. A new species of *Comantella* (Asilidae, Diptera). *Canadian Ent.* 58: 310–312.
- . 1927. Descriptions of Nearctic Diptera. *Canadian Ent.* 59: 79–92.
- . 1930. New Diptera from North and Central America. *Amer. Mus. Novitates* 415: 1–16.
- . 1934. The families and genera of North American Diptera. New York. 512 pp.
- HINE, J. S. 1906. Two new species of Diptera belonging to Asilinae. *Ohio Nat.* 7: 29–30.
- . 1908. Two new species of Asilidae from British Columbia. *Canadian Ent.* 40: 202–204.
- . 1909. Robber flies of the genus *Asilus*. *Ann. Ent. Soc. Amer.* 2: 136–172 (= contributions from the Ohio State Univ. Dept. Zool. and Ent. No. 32).
- . 1911. Robber flies of the genera *Promachus* and *Proctacanthus*. *Ann. Ent. Soc. Amer.* 4: 153–172 (= contributions from the Ohio State Univ. Dept. of Zool. and Ent. No. 33).
- . 1916. Descriptions of robber flies of the genus *Erax*. *Ohio Jour. Sci.* 17: 21–22.
- . 1918. Descriptions of seven species of *Asilus* (family Asilidae). *Ohio Jour. Sci.* 18: 319–322.
- . 1919. Robber flies of the genus *Erax*. *Ann. Ent. Soc. Amer.* 12: 103–154 (= contributions from the Ohio State Univ. Dept. of Zool. and Ent. No. 57).
- HULL, F. M. 1957. Some new species of robber flies (Diptera: Asilidae). *Psyche* 64: 70–75.
- JAMES, M. T. 1937a. New Colorado Asilidae (Diptera). *Ent. News* 48: 12–15.
- . 1937b. The genus *Comantella* Curran (Diptera: Asilidae). *Pan-Pac. Ent.* 13: 61–63.
- . 1941. The robber flies of Colorado (Diptera: Asilidae). *J. Kansas Ent. Soc.* 14: 27–53.
- . 1942. Additions to the "Robber Flies of Colorado." *J. Kansas Ent. Soc.* 15: 124–126.
- JOHNSON, C. W. 1918. Notes on the species of the genus *Dioctria*. *Psyche* 25: 102–103.
- JOHNSON, D. E. 1936. A further study of Utah Asilidae. Unpublished thesis, Brigham Young University, Provo, Utah.



Figs. 129–132. Utah Asilidae, distribution: 129, *Stenopogon mexicanus* and *Stenopogon utahensis*; 130, *Stenopogon rufibarbis*; 131, *Stichopogon fragilis*, *Stichopogon salinus*, *Stichopogon trifasciatus*, and *Taracticus ruficaudus*; 132, *Wilcoxia painteri*.

- . 1942. A new *Cyrtopogon* (Asilidae, Diptera) from Utah. Great Basin Nat. 3: 1–4.
- . 1958. A new species of *Mallophora* from the Great Salt Lake Desert (Diptera: Asilidae). Great Basin Nat. 18: 41–42.
- KNOWLTON, G. F., AND F. C. HARMSTON. 1938. Utah Asilidae. Proc. Utah Acad. Sci. 15: 123–125.
- KNOWLTON, G. F., F. C. HARMSTON, AND G. S. STAINS. 1939. Utah Diptera. Mimeo Ser. 200 (Tech.) 5: 4–5.
- LINNAEUS, C. 1758. Systema naturae per regna tria naturae. Ed. 10. Stockholm. 824 pp.
- . 1763. Amoenitates Academicæ, seu dissertationes variae physicae, medicae, botanicae, antehac seorsim editae, nunc collectae et auctae cum tabulis aeneis. Vol. 6. Stockholm. 486 pp.
- LOEW, H. 1866. Diptera Americae septentrionalis indigena. Centuria septima. Berliner Ent. Zeitschr. 10: 1–54.
- . 1874. Neue nordamerikanische Dasypogonina. Berliner Ent. Zeitschr. 18: 353–377.
- MACQUART, J. 1834. Histoire naturelle des insectes. Diptera. Vol. 1. Paris. 578 pp. (Collection des suites a Buffon) [q.v.].
- . 1838. Diptere exotiques nouveaux ou peu connus. Soc. Roy. des Sci., de l'Agr. et des Arts, Lille, Mem. 1838 (2): 9–225.
- MARTIN, C. H. 1957. A revision of the Leptogastrinae in the United States (Diptera: Asilidae). Bull. Amer. Mus. Nat. Hist. 111: 347–385.
- . 1959. The *Holopogon* complex of North America, excluding Mexico, with the descriptions of a genus and a new subgenus (Diptera: Asilidae). Amer. Mus. Novitates 1980: 1–40.
- . 1962. The mistaken identity of *Proctacanthus arno* Townsend and a new species (Diptera: Asilidae). J. Kansas Ent. Soc. 35: 185–188.
- . 1968. A revision of *Ospreocerus* (Diptera: Asilidae). Proc. California Acad. Sci. 35: 401–424.
- . 1975. The generic and specific characters of four old and six new Asilini genera in the western United States, Mexico, and Central America (Diptera: Asilidae). Occ. Pap. California Acad. Sci., No. 119. 107 pp.
- MCATEE, W. L. 1919. Key to the Nearctic species of the genus *Laphria* (Diptera: Asilidae). Ohio Jour. Sci. (1918) 19: 143–172.
- MELANDER, A. L. 1923a. The genus *Cyrtopogon* (Diptera: Asilidae). Psyche 30: 102–119.
- . 1923b. The genus *Lasiopogon* (Diptera: Asilidae). Psyche 30: 135–145.
- . 1923c. Studies in Asilidae (Diptera). Psyche 30: 207–219.
- OSTEN SACKEN, C. R. 1877. Western Diptera: Descriptions of new genera and species of Diptera from the region west of the Mississippi and especially from California. U.S. Dept. Interior Geol. and Geog. Survey of the Terr., Bull. 3: 189–354.
- . 1887. Diptera. Pages 129–216 in F. D. Godman and O. Salvin, eds., Biologia Centrali-Americana [q.v.]. Zoologia-Insecta-Diptera. Vol. 1. London. 378 pp.
- PAPAVERO, N., AND N. BERNARDI. 1973. Studies of Asilidae (Diptera) systematics and evolution. III. Tribe Blepharepiini (Dasypogoninae). Arq. Zool., São Paulo 24: 163–209.
- PRITCHARD, A. E. 1935. New Asilidae from the southwestern U.S. (Diptera). Amer. Mus. Novitates 813: 1–13.
- . 1938. The genus *Hodophylax* James, with a description of *basingeri*, new species (Diptera: Asilidae). Pan-Pac. Ent. 14: 129–131.
- . 1943. Revision of the genus *Cophura* Osten Sacken (Diptera: Asilidae). Ann. Ent. Soc. Amer. 36: 281–309.
- SAY, T. 1823. Descriptions of dipterous insects of the U.S. J. Acad. Nat. Sci. Phila. 3: 9–54, 73–104.
- . 1824. Appendix, Part I. Natural History. 1. Zoology. E. Class Insecta. Pages 268–278 in W. H. Keating, Major Long's second expedition [q.v.]. Vol. 2. Philadelphia. 459 pp.
- SCHAEFFER, C. 1916. New Diptera of the family Asilidae with notes on known species. J. New York Ent. Soc. 24: 65–69.
- SCHINER, I. R. 1867. Neue oder weniger bekannte Asiliden der K. zoologischen Hofcabinets in Wien. K. K. Zool.-Bot. Gesell. Wien, Verhandl. 17 (Abhandl.): 355–412.
- STONE, A., C. W. SABROSKY, W. W. WIRTH, R. H. FOOTE, AND J. R. COULSON. 1965. A catalog of the Diptera of America north of Mexico. U.S. Dept. Agr., Agr. Res. Serv., Washington, D.C. 1696 pp. (Asilidae, pp. 360–401, 1113–1116).
- TUCKER, E. S. 1907. Some results of desultory collecting of insects in Kansas and Colorado. Kansas Univ. Sci. Bull. 4 (=whole ser., 14): 51–112 [=Kansas Univ. Bull. 7(5)].
- WALKER, F. 1849. List of the specimens of dipterous insects in the collection of the British Museum. Four parts and three supplements. London. Pt. 2: 231–484.
- . 1851. Insecta saundersiana; or characters of undescribed insects in the collection of William Wilson Saunders, Esq. in 5 parts. 474 pp.
- WILCOX, J. 1935. New asilid flies of the genus *Ablautus* with a key to the species. Canadian Ent. 67: 222–227.
- . 1936a. A new robber fly, with a key to the species of *Callinicus* and *Chrysoceria*. (Diptera: Asilidae). Ent. News 47: 208–210.
- . 1936b. Asilidae, new and otherwise, from the Southwest, with a key to the genus *Stichopogon*. Pan-Pac. Ent. 12: 201–212.
- . 1941. New *Heteropogon* with a key to the species (Diptera: Asilidae). Bull. Brooklyn Ent. Soc. 36: 50–56.
- . 1946. New *Nicocles* with a key to the species (Diptera: Asilidae). Bull. Brooklyn Ent. Soc. 40: 161–165.
- . 1960. *Laphystia* Loew in North America (Diptera: Asilidae). Ann. Ent. Soc. Amer. 53: 328–346.
- . 1964. The genus *Metapogon* (Diptera: Asilidae). Pan-Pac. Ent. 40: 191–200.
- . 1965. New *Heteropogon* Loew, with a key to the species and the description of a new genus (Diptera: Asilidae). Bull. S. California Acad. Sci. 64: 207–222.
- . 1966a. *Efferia* Coquillett in America north of Mexico. (Diptera: Asilidae). Proc. California Acad. Sci. 34: 85–234.



Nelson, C Riley. 1987. "ROBBER FLIES OF UTAH (DIPTERA: ASILIDAE)." *The Great Basin naturalist* 47(1), 38–90.

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