PANGONIINAE OF UTAH (TABANIDAE: DIPTERA[1])

J. A. ROWE AND G. F. KNOWLTON[2]

The abundance, the blood-sucking habits, the annoyance to livestock and man, and the actual and potential ability to transmit disease makes the family Tabanidae of particular importance in Utah. Studies of insect transmission of equine encephalomyelitis, conducted at the Utah Agricultural Experiment Station, and the need for more ready recognition of the species in the field, has led to the present treatment.

The writers are indebted: To Dr. V. M. Tanner, Brigham Young University, Provo, Utah, for so generously lending material; and to Dr. C. B. Philip, of the U. S. Public Health Service, and Dr. A. Stone, of the U. S. Bureau of Entomology and Plant Quarantine, for helpful suggestions and identifications.

The Pangoniinae are horseflies which bear apical spurs on the hind tibiae.

KEY TO GENERA

1. Eyes distinctly pubescent.....**Osca** Walker
   Eyes bare..... 2
2. Third segment of antennae with at least seven annuli, front of female much wider below than above.....**Apatolestes** Williston
   Third segment of antennae with not more than five annuli, front of female almost parallel-sided..... 3
3. Second segment of antennae only half as long as the first, eyes in life with many small dots.....**Silvius** Meigen
   Second segment of antennae as long or nearly as long as the first, wings with dark pictures.....**Chrysops** Meigen

Osca californica (Big.)

Diatomineura californica Bigot, Mem. Soc. Zool. France, 5: 618. 1892.
Pangonia dives Will., Kan. Acad. Sci., 10: 130. 1886.

Characteristics—Large and robust; general color yellow; each abdominal tergite with anterior half brown or black and posterior half yellow; male more pilose than female, with the black of the abdomen often in the form of a median row of spots; antennae reddish-yellow, annulate portion black.

Habitat—Logan, Brigham, Farmington, Salt Lake City.

Hine (1904) declared the synonomy of *D. californica* Big. (1892), with *P. dives* Will. 1887; however, there is an earlier *P. dives* Macquart (1857), and by reason of this preoccupation Bigot's name should stand.

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[1]Contribution from the Department of Entomology, Utah Agricultural Experiment Station.

[2]Co-authors: Graduate Research Assistant and Associate Entomologist, respectively. Publication authorized by Director.

This species has been referred to various genera including *Buplex* Aust., *Scaptia* Walk., and *Osca* Walk. Because of the pubescence of the eyes it should not be referred to *Buplex*. Major Austen of the British Museum has compared it with *Pangonia patula* Walk. and *P. crassa* Walk., both of which were referred to *Scaptia* by Walker; it is Austen's opinion that this species is not referable to *Scaptia* but to *Osca*. Following Hine (1920, 1925), this species would be referred to as *Osca* Walk.

Apatolestes comastes Will.

Williston, Entom. Americana, 1: 12. 1885

This genus and species is not represented in our collection, but the close proximity of its range to Utah warrants mention here. The front of the female is much wider below than above and nearly entirely shining black.

Habitat—California, Arizona.

Genus **Silvius** Meigen

Meigen, Syst. Beschr. Zweifl. Ins., 2: 27. 1820

Hind tibiae with spurs at tip; first posterior cell open; ocelli present, wings usually with isolated spots and a rather large stigmal spot; eyes bare or with few short, scattered hairs; third segment of antennae composed of five annuli, the first much longer than those following, second segment of antennae half as long as first; type, *Tabanus vituli* Fabr.

KEY TO SPECIES

1. Wing with no black spots, body yellowish.....**gigantulus**
   Wing with black spots, body silvery..... 2
2. Dorsum of thorax with blackish stripes, abdomen with four distinct rows of black spots.....**quadrivittatus**
   Dorsum of thorax without blackish stripes, abdomen with two rows of black spots or none.....**pollinosus**

Silvius quadrivittatus (Say)

Say, Jour. Acad. Sci., Phil., 3: 33. 1923. (*Chrysops*), near Rocky Mountains

Characteristics—The key will serve to separate this species.

Habitat—Ft. Duchesne, Salina, Bluff, Zion National Park, and Santa Clara.

Silvius gigantulus (Loew)

Loew, Cent., 10: 12 (*Chrysops*), California

This species is not represented in our collection, but its extensive western distribution indicates that it probably occurs within the state. The wings are hyaline and without spots and yellowish along the costa; body yellowish; antennae yellowish, with the greater part of third segment brown; face with two small spots in triangular frontal callosity and ocelli dark brown; remainder of head and thorax yellow pollinose, with yellow pile.

Habitat—Vancouver Island, Washington, Colorado, California, Idaho, and New Mexico.

Silvius pollinosus Will.

Williston, Conn. Acad. Sci., 4: 244. 1880
Williston, Kans. Acad. Sci., 10: 131 (Western Kansas), 1886

Published records for Utah (Knowlton, 1931, 1934), from Ft. Duchesne (June 2, 1926) (W. Sorenson) may have been given from a misidentified *S. quadrivittatus*. This species is not represented in our collection and it is doubtful if it occurs in the state. It differs from *S. quadrivittatus* in having the wings more whitish; dorsum of abdomen with two rows of black spots or none; no black stripes on the dorsum of the thorax.

Genus **Chrysops** Meigen

Meigen, Illiger's Mag., 2: 267. 1803
Meigen, Syst. Beschr., 2: 50. 1820

Characteristics—Eyes bare or with few short, scattered hairs, with irregular green patches in life; ocelli present; wings with dark connected pictures, first posterior cell open; hind tibiae with spurs at the tip (sometimes small); third antennal composed of five annuli, the first much longer than the succeeding ones; second antennal more than half as long, or equal to, the third; type, *Tabanus caecutiens* Linn.

KEY TO SPECIES

1. Apex of the wing beyond the cross-band entirely hyaline or with the marginal cell slightly dusky 2
   Apex of the wing beyond the cross-band not entirely hyaline, usually with a prominent apical dark cloud extending at least into the submarginal cell 4
2. Abdomen with greater part of first two segments yellow (Fig. 2) .... **excitans**
   Abdomen with first two segments black 3
3. Base of fifth posterior cell hyaline, anal and axillary cells entirely hyaline (Fig. 5) ..... **carbonarius**
   Base of fifth posterior cell dark, anal and axillary cells smoky along the sixth long vein (Fig. 11) ..... **mitis**
4. First antennal segment distinctly dilated 5
   First antennal segment not dilated 7
5. Hyaline triangle of wing separated from the posterior margin of the wing (Fig. 13) ..... **fulvaster**
   Hyaline triangle reaching posterior margin of wing 6
6. Wing with hyaline spots in the first submarginal, discal and fourth posterior cells (Fig. 8). Callosities of head and first antennal segment extremely dilated (Fig. 14) ..... **dilatus** n. sp.
   Wing with the above cells entirely infuscated (Fig. 9). Callosities of the head and first antennal segment moderately dilated ..... **coquillettii**
7. Wings with a hyaline spot in the discal cell (Fig. 10). Abdomen yellowish with four rows of black spots ..... **discalis**
   Wings with discal cell infuscated 8
8. Abdomen entirely black, apical spot of the wing separated from the cross-band (Fig. 12) ..... **noctifer**
   Abdomen bicolored, apical spot of wing connected to cross-band 9
9. Second segment of abdomen with a black spot on the sides (Fig. 4). Wings with the apical spot narrow, confined to the costal border (Fig. 7) ..... **aestuans**
   Second abdominal segment yellow on the sides (Fig. 3). Apical spot not confined to costal margin ..... **lupus**

Chrysops aestuans v. d. Wulp

C. moerens Walker, List., 1: 201. 1848.
C. aestuans v. d. W. Tijdsch. Vor Ent., 10: 135. 1867.

Characteristics—Abdomen black beyond second tergite, with a median row of prominent gray triangles; second tergite with two lateral black triangles (these often not entirely isolated in the male); wings with the apical spot confined to the costal margin.

Habitat—Logan, Locomotive Springs, Penrose, Corinne, Utah; Paris, Idaho. This species is quite common, often taken with *C. fulvaster* but less abundant. The synonomy is by C. B. Philip, 1931.

Chrysops carbonarius Walker

Walker, List, I: 203. London. 1848
Hine, Ohio Nat., 5: 220. 1904
Philip, Minn. Agr. Exp. Sta. Tech Bul. 80: 84. 1931

Characteristics—Abdomen uniformly black; wings beyond cross-band hyaline; base of fifth posterior cell hyaline.

Hine (1904) has given the synonyms of this species as worked out by Osten Sacken and Miss Ricardo as *C. niger* Walk. (not Macq.), *C. provocans* Walk., *C. atru* Macq., *C. fugaz* O. S. The Aldrich catalog (1905) lists *C. carbonarius* Walk. as variety B. of *C. niger* Macq.; *Chrysops niger* Macq. has not been taken from this state, but we have a specimen from Ohio which differs greatly from our *C. carbonarius* Walk. The writers are of the opinion that both should be considered as valid species. *C. carbonarius* can be distinguished from *C. mitis* by the hyaline base of the fifth posterior cell and by the hyaline character of the anal cell and axillary lobe.

Habitat—Plain City, Sheep Creek (Duchesne Co.).

Chrysops coquillettii Hine

Hine, Ohio Nat., 5: 220. 1904

Characteristics—First segment of antennae dilated; second tergite yellow with a median, geminate black spot; wings of female as shown in Figure 9.

Habitat—Zion National Park and Glendale.

Chrysops dilatus n. sp.

Female—Length, 7 mm.; occiput yellowish-gray pollinose; ocellar area polished black, quite small; frontal callus very prominent, somewhat tri-lobed when viewed from behind, polished yellow with a black spot on either side, otherwise vertex and front yellow pollinose; facial callositus exceedingly prominent polished yellow, except for a narrow yellow pollinose strip below the antennae; genae yellow except for a minute black spot below, polished only below the black spot, otherwise yellow pollinose; antennae very long, first segment unusually dilated (Fig. 14), yellowish; second segment somewhat dilated over the basal two-thirds, shorter than the third, yellowish; third black, first annuli somewhat lighter; thorax black in ground color; notum yellowish gray pollinose, thicker along two indistinct narrow lateral stripes; pleura

uniformly yellowish-gray pollinose; legs, including fore coxae, yellow except the joints, the apical third of the first tibiae, and the greater part of all tarsi which are black; wings (Fig. 8) peculiar in having the first submarginal discal and fourth posterior cells with prominent hyaline spots; abdomen dark in ground color, lighter on the caudal margin of segments; notum grayish-yellow pollinose and with two rows of subpolished dark spots.

One specimen has the abdomen yellow in ground color, which makes the spots of the dorsum more conspicuous. The hyaline spots in the dark cross-band are distinctive.

Holotype—Leeds, Utah, July 10, 1934 (Knowlton and Smith). In collection of the U. S. National Museum. *Paratypes*—One female, St. George, (Tanner); 20 specimens, Leeds, June 16, 1935 (Knowlton and C. J. Sorenson); Zion National Park, August 13, 1929; Pinturia, August 11, 1929; St. George, June 5–7, 1919, in Utah. Paratypes in the collections of the Entomology Departments of: Ohio State University, University of Kansas, Brigham Young University, Utah Agricultural Experiment Station, and of Dr. C. B. Philip.

Dr. C. B. Philip compared the material of *Chrysops dilatus* n. sp. with material of *C. pachycera* Will. in the University of Kansas collection. Dr. Philip reported that the Utah material would, in his opinion, constitute at least a good variety, although some workers might not consider that it should rank as a distinct species. The wing pattern is usually constant throughout the large series of Utah specimens examined.

Chrysops discalis Williston

Williston, Trans. Conn. Acad. Sci., 4: 245. 1880
Hine, Ohio Nat., 5: 221. 1904

Characteristics—General color gray; abdomen grayish with four rows of black spots; wings with discal cell hyaline.

Habitat—Many localities throughout northern and central Utah. This species is one of the most common and is particularly fond of open salt marshes.

Chrysops excitans Walker

Walker, Dept. Ins. Sound: 72. London. 1850
Osten Sacken, Prodome, 2: 373. 1875
Hine, Ohio Nat., 5: 222. 1904
Philip, Minn. Agr. Exp. Sta. Tech. Bul. 80: 84. 1931

Characteristics—Wings beyond cross-band hyaline; first two tergites yellow with a median black spot on each, that of the second deeply posteriorly emarginate; remainder of abdomen black.

Philip, 1931, declares *C. sordidus* Washb. (1905) a synonym.

Habitat—Uintah Mountains.

Chrysops fulvaster O. S.

O. S. Bull. U. S. Geol. Surv. of the Terr., 3: 221. 1887
Hine, Ohio Nat., 5: 223. 1904

Characteristics—The first antennal segment dilated; wings with the hyaline triangle separated from the posterior border of the wing; a brownish species.

Philip (1931) gives *Heterochrysops fulvaster* Krober (1928) as a synonym.

Habitat—This is the most common species of the genus in Utah and has been taken in numerous localities throughout the state. The females are vicious biters and readily attack man. It is a constant pest of domestic animals, especially those corralled near saltmarsh areas.

Chrysops lupus Whitney

Whitney, Canadian Entomologist, 36: 205. 1904
Hine, Ohio Nat., 5: 224. 1904
Philip, Minn. Agr. Exp. Sta. Tech. Bul. 80: 88. 1931

Characteristics—Wings with prominent apical spot; hyaline triangle extending across second long vein; abdomen predominately yellow; first and second tergite yellow, each with a median black spot, that of the second emarginate behind; third and fourth tergites each with four black spots, the lateral ones less prominent.

Habitat—Provo.

Some workers consider this species a synonym of *C. furcatus* Walk., but *C. lupus* has the lower half of the genae black while those of *C. furcatus* are entirely yellow. The distribution of the two seem to suggest that they are distinct species.

Chrysops mitis O. S.

O. S. Mem. Bost. Soc. Nat. Hist., 2: 374 (Prodome). 1875
Hine, Ohio Nat., 5: 224. 1904
Philip, Minn. Agr. Exp. Sta. Tech. Bul. 80: 89. 1931

Characteristics—This species can be separated from *C. carbonarius* by its somewhat larger size, the infuscation of the base of the fifth posterior cell, the infuscation along the sixth long vein, and the sub-hyaline appearance of the axillary lobe.

Habitat—Snowville.

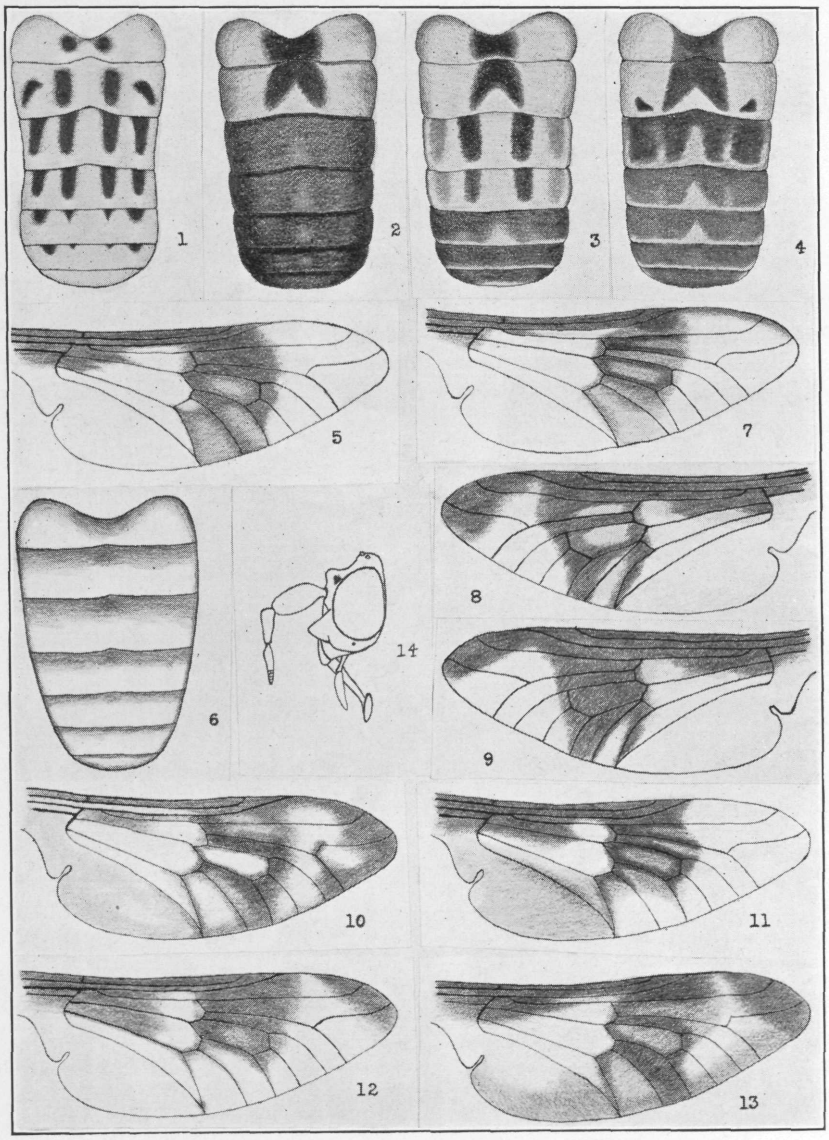
Chrysops noctifer O. S.

O. S. Bull. U. S. Geol. Surv. of the Terr., 3: 220. 1877
C. pertinax Will., Tran. Kan. Acad. Sci., 10: 132. 1886
C. nigriventris Big., Mem. Soc. Zool. Fr. 5: 604. 1892

Characteristics—Color black; tergites with white pile quite distinctly arranged on the lateral margins, a rather large lateral thinly pollinose spot on the first and second tergite, a distinct median row of spots which seem to fade out on the apical tergites; wings with the apical spot separated from the cross-band.

Habitat—Dry Canyon (Logan), Mirror Lake (Uintah Mts.), Aspen Grove (Timpanogos). This species seems to be more or less restricted to the mountainous areas of the state.

The synonomy is by Hine (1904).



Illustrations of Utah Pangoniinae

1. *S. quadrivittatus* (Say).
2. *C. excitans* Walker
3. *C. lupus* Whitney.
4. *C. aestuans* v. d. Wulp.
5. *C. carbonarius* Walker.
6. *O. californica* (Big.)
7. *C. aestuans* v. d. Wulp.
8. *C. dilatus* n. sp.
9. *C. coquillettii* Hine.
10. *C. discalis* Williston.
11. *C. mitis* O. S.
12. *C. noctifer* O. S.
13. *C. fulvaster* O. S.
14. *C. dilatus* n. sp.