

NOTES ON THE NORTH AMERICAN SPECIES OF THE ZODION FULVIFRONS GROUP

(Diptera, Conopidae)

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In a previous paper (Ent. News, 54:187-191, 1943) the Oblique-fasciatum Group species has been covered and the sources of material acknowledged. As a result of the present study of the large series of specimens that has been aggregated, a number of species previously recognized appear to be synonyms. Some of these may prove to be separable in the future, and the necessity of depending on descriptions, since most of the types have not been seen, increases this possibility; but I believe that the present contribution will aid considerably in a better understanding of this difficult group. While the majority of specimens fall into definable species, individual variation frequently overlaps two species so that an artificial line of division must be established. This refers to species occurring in the same region as well as to intermediates between geographical races.

ZODION FULVIFRONS SAY

Zodion fulvifrons Say, 1823, Jour. Acad. Nat. Sci. Philadelphia, 3:83; Compl. Writ., 2:74 (Maryland).

Zodion abdominalis Say, 1823, Jour. Acad. Nat. Sci. Philadelphia, 3:84; Compl. Writ., 2:74 (near Rocky Mountains).

Myopa rubrifrons Desvoidy, 1830, Mem. Sav. étr. Acad. Sci. Paris, 2:247 (Philadelphia).

Zodion flavipennne Bigot, 1887, Ann. Soc. Ent. France (6)7:204 (Mexico).

Zodion lativentre Graenicher, 1910, Canad. Ent. 42:26 (Wisconsin: Yellow R., Burnett Cr.).

Zodion sayi Banks, 1916, Ann. Ent. Soc. Amer. 9:194 (Virginia: Falls Church).

Zodion obscurum Banks, 1916, Ann. Ent. Soc. Amer. 9:194 (California: Bear Valley, San Bernardino County)

? *Zodion bilineata* Van Duzee, 1927, Proc. Calif. Acad. Sci., 16:586 (Oregon: Wallowa Mountains).

This species is characterized by the larger size: usually 6-8 mm.; the short, wide, thick female genital plate; and the reddish abdomen of the male. The female abdomen is usually dark, but may be reddish on the basal segments. The first posterior cell is practically always open.

There are two main forms of this species. One has the dorsum of the thorax covered with bluish pollen and with two dark lines; the other has more brownish pollen and five lines on the dorsum of the thorax (= *sayi*). Most individuals however are somewhat intermediate, and the intergradation is complete. With the decrease in thoracic lines and more bluish pollen, the abdomen is usually more reddish, and the proboscis tends to become longer. Such individuals are more common in the West. A further extreme are those examples with so much pollen that the dorsal thoracic lines are indistinct. *Obscurum* seems to be based on such specimens.

In the past, it has been considered that the abdomen of the male of this species may be reddish or entirely dark; but I have found no contra-indication to referring all specimens with entirely dark abdomens to *intermedium*, although there is complete intergradation between the two types. There is also complete intergradation between this and a smaller species for which the name *abitus* is used here. Formerly, *abdominale* was used for this smaller species, but the name clearly belongs to a species "rather more than one-fourth of an inch" in length. The specimen mentioned by Say under *abdominalis* as "less than half the above size" does of course belong to the smaller species. I have set the dividing line between the two species at 5½ mm., but the majority of individuals are well above or below this size.

I have examined the type of *lativentre* and find it to be a greasy specimen of the present species. *Bilineatum* based on an example with a very long third antennal joint, will, I believe, prove to be an aberrant individual.

Distribution: Southern Canada, United States, and Mexico. 363 specimens examined.

ZODION INTERMEDIUM BANKS

Zodion intermedium Banks, 1916, Ann. Ent. Soc. Amer. 9:193 (Pennsylvania: Pocono Lake).

Zodion occidentale Banks, 1916, Ann. Ent. Soc. Amer. 9:194 (Oregon: Montaville).

Zodion reclusum Banks, 1916, Ann. Ent. Soc. Amer. 9:194 (California: Redlands).

Zodion basalis Van Duzee, 1927, Proc. Calif. Acad. Sci., 16:586 (Idaho: Moscow Mountains).

This species differs from *fulvifrons* by the long, narrow, thin female genital plate, and the entirely dark abdomen of the male.

As in *fulvifrons* there is similar variation in the thoracic lines and length of the proboscis. *Basale* is based on indistinct thoracic lines, and *reclusum* on a long proboscis. There is a certain amount of variation in the size and shape of the genital plate, and intermediates bridge *intermedium* with *occidentale*. The relative length of the genital plate is frequently deceptive, and when the abdomen is extended may resemble that of *perlongum* which is proportionately longer and narrower. The border of dark striations is narrow in *intermedium* and *perlongum*, but very wide in *fulvifrons*.

Distribution: Southern Canada and United States. 162 specimens examined.

ZODION PERLONGUM COQUILLET

Zodion perlongum Coquillett, 1902, Canad. Ent., 34:199 (New Mexico: Rio Ruidosa).

This species is characterized by its large size: 7-9 mm.; very long, narrow, thin female genital plate; and the long, narrow abdomen due to the third and fourth abdominal segments which are longer than wide.

This species is known with certainty only in the female sex. The males are probably large individuals with reddish abdomens that cannot be distinguished from *fulvifrons*.

Distribution: United States and Northern Mexico. 22 specimens examined.

ZODION ABITUS ADAMS

Zodion abitus Adams, 1903, Kans. Univ. Sci. Bull., 2:33 (Kansas).

Zodion bicolor Adams, 1903, Kans. Univ. Sci. Bull., 2:35 (Kansas Douglas County).

This species is characterized by its small size: usually $4\frac{1}{2}$ -5 mm., reddish abdomen of the male, and usually closed first posterior cell.

The abdomen of the male is usually entirely reddish except for the first segment, with yellow pollen on the sides and distal

segments. Some specimens have dark markings representing intergradation with the entirely dark male abdomen of *cinereiventre*. Such individuals and those with an open first posterior cell are more common in the Western portion of the range of the species. The first posterior cell varies from narrowly open to petiolate as long as the anterior cross-vein. The palpi are short, not clavate, and about as long as the width of the proboscis.

The use of the name *abitus* instead of *abdominale* is explained under *fulvifrons*. *Abitus* is based on the female, and *bicolor* on the male.

Distribution: Southeastern Canada and Eastern United States, west to Colorado (Boulder, Buena Vista, Ridgway). 73 specimens examined.

ZODION CINEREIVENTRE VAN DUZEE

Zodion cinereiventris Van Duzee, 1927, Proc. Calif. Acad. Sci., 16:585 (California: Huntington Lake, Fresno County).

This species is characterized by its small size: $4\frac{1}{2}$ -5 mm., the dark abdomen of the male, and the open first posterior cell.

This species is similar to *abitus* in the female and differs only in that the first posterior cell is always open. It is probable that this cell may be closed, showing variation similar to *abitus*, but in the East such individuals are referable to *abitus* and on the West Coast to *triste*. Females with rather wide first posterior cells have been seen from Michigan and New York, but may be considered extremes of *abitus*. Typical dark abdomened males have been examined from as far east as Illinois.

Distribution: Western United States east definitely to Illinois. 34 specimens examined.

ZODION TRISTE BIGOT

Zodion triste Bigot, 1887, Ann. Soc. Ent. France (6)7:203 (California).

This name is used here for a species in which the female genital plate is long, moderately wide, and thin in antero-posterior dimension; and yellowish narrowly edged with the dark striations. The first posterior cell is closed or narrowly open. The length is $4\frac{1}{2}$ -5 mm., and it is otherwise similar to *cinereiventre*. The males in which the first posterior cell is open cannot be distinguished from *cinereiventre* and would be referred here only when associated with the female.

Distribution: California (San Diego). 1 ♀, 1 ♂ (1st post. cell closed), 1 ♂ (1st post. cell open).

ZODION NIGRIFRONS KRÖBER

Zodion nigrifrons Kröber, 1915, Arch. Nat., 81 A., h.4, 97 (California).

Zodion hirtipes Van Duzee, 1927, Proc. Calif. Acad. Sci., 16:587 (California: Melrose, Alameda County).

This species differs from the other members of the genus by the characteristic fourth vein, the last segment of which ends about halfway toward the wing margin. This character has proved constant in the twelve specimens examined and was mentioned in the original descriptions of both *nigrifrons* and *hirtipes*. The species in general has long hairs and is very dark, the front and antennae being usually almost entirely dark, and the thorax so dark that the darker dorsal lines may be quite indistinct. The palpi are short, about $1\frac{1}{2}$ x width of the proboscis, and not clavate. Length, $4\frac{1}{2}$ -5 mm.

Distribution: California (Melrose, Alameda County; Berkeley; Fish Ranch, Berkeley Hills). 12 specimens examined.

ZODION AMERICANUM WIEDEMANN

Zodion americana Wiedemann, 1830, Auss. Zw. Ins., 2:242 (Montevideo).

Zodion nanellum Loew, 1869, Berl. Ent. Zeitschr., Cent. VIII, 75 (District of Columbia).

Zodion pygmaeum Williston, 1885, Trans. Conn. Acad., 6:381 (California).

? *Zodion occidentalis* Walker, 1849, List. Dipt. Brit. Mus., 3:676 (Ohio).

This species is characterized by its small size: 3-5 mm., constantly open first posterior cell, and relatively sharply defined black markings of the thorax and abdomen.

This species differs from *cinereiventris* and the other small forms in being covered with finer pollen which is bluish or greenish; and in having the dark markings usually more extensive, more opaque, and more sharply defined.

The variation in dark markings is very great and completely bridges the difference between *nanellum* and *pygmaeum*. Three males from New Mexico (Highrolls, Alamogordo) completely lack the thoracic lines and spots, and have less black on the abdomen than usual. These may represent another species. Nor-

mally patterned specimens have been examined from Highrolls.

Kröber has compared the type of *americanum* with *nanellum* and considers them the same species. I have seen examples of this species from a number of localities in South and Central America.

Distribution: Southern Canada, United States, Central America, and South America. 226 specimens examined.

ZODION PALPALE ROBERTSON

Zodion palpalis Robertson, 1901, *Canad. Ent.*, 33:284 (Illinois: Carlinville).

This species is characterized by the black, long, clavate palpi; which are $2\frac{1}{2}$ -3x the width of the proboscis at the level of the palpi. The first posterior cell usually has a long petiole, but it may be narrowly open. The labellae of the proboscis are quite long, about one-fourth the total length of the proboscis. They are much shorter in the previous species but apparently are long also in *loveti* and *parvum*. When the labellae are together it may be difficult to decide their length. The abdomen of the male has the second and third segments yellow, more reddish on the distal part of the third; and is relatively long and slender. The legs are rather slender and entirely dark. Length, 5 mm.; 1 ♂ 4 mm.

Distribution: Illinois (Carlinville) and North Carolina (Raleigh). 19 specimens examined, including the type.

ZODION SCAPULARE ADAMS

Zodion scapularis Adams, 1903, *Kans. Univ. Sci. Bull.*, 2:34 (Arizona).

This species has not been seen by the writer, but has been incorporated into the key. It represents a species between *palpale* and *parvum*, having the abdomen of the former and the palpi of the latter. Very few specimens are known of this group of species and additional material may show that some of these represent individual variation.

Distribution: Arizona.

ZODION PARVUM ADAMS

Zodion parvis (*parvus* in key) Adams, 1903, *Kans. Univ. Sci. Bull.*, 2:34 (Arizona).

This species is characterized by its small size: $3\frac{1}{2}$ mm.; long petiole of the first posterior cell: 3x anterior cross-vein; short,

pale, non-clavate palpi, 1x width of proboscis; and dark abdomen of the male. The legs are slender and dark, and the labelae about one-third the length of the entire proboscis.

Distribution: Arizona and Colorado (no locality). One specimen examined.

ZODION LOVETTI VAN DUZEE

Zodion lovetti Van Duzee, 1934, Ann. Ent. Soc. Amer., 27:323 (Colorado: Fort Collins).

This species is characterized by its long (2x width of proboscis), but not clavate palpi; entirely dark abdomen of the male; and small size: 4 mm. The first posterior cell is closed in the wing margin to petiolate as long as anterior cross-vein. The legs are slender and entirely dark.

This species represents another link between *palpale* and *parvum*, having the long, though not clavate palpi of the former, and the dark abdomen of the latter.

Distribution: Colorado (Fort Collins, Tennessee Pass). One specimen examined.

The following species, each based on a single female, are not known to the author, and have not been included in the key:

Zodion albifacies Van Duzee, 1927, Proc. Calif. Acad. Sci., 16:588 (Arizona: Baboquivari Mountains).

Zodion angusticornis Van Duzee, 1927, Proc. Calif. Acad. Sci., 16:589 (California: Los Banos).

Zodion bimacula Curran, 1933, Amer. Mus. Nov., 673:7 (Ontario: Timagami).

KEY TO THE NORTH AMERICAN SPECIES OF ZODION.

1. Thorax marked with black spots.....*pictulum*
- Thorax marked with stripes or unmarked.....2
2. Thorax dark with two relatively wide light stripes.....3
- Thorax light with relatively narrow dark stripes or unmarked5
3. Abdomen with golden yellow pollen on distal segments.....*albonotatum*
- Abdomen with oblique white or bluish pollinose markings.....4
4. Abdomen dark with bluish pollinose markings.....*cyanescens*
- Abdomen mostly rufous with white pollinose markings.....*obliquefasciatum*
5. Abdomen with golden pollen on distal segments; never with anterior submedian thoracic lines.....*albonotatum*
- Abdominal pollen if yellowish, never golden.....6

6. Abdomen mostly rufous with oblique white pollinose marks; anterior submedian thoracic lines absent.....*obliquefasciatum*
- Abdomen usually dark, pollinose pattern if oblique not distinctly so; frequently with anterior submedian thoracic lines..7
7. Over 5½ mm. long from base of antennae to tip of abdomen..8
- 5½ mm. long or less.....12
8. Females.....9
- Males.....11
9. Genital plate short, wide, and thick.....*fulvifrons*
- Genital plate long, narrow and thin.....10
10. Abdominal segments 3 and 4 shorter than wide...*intermedium*
- Abdominal segments 3 and 4 longer than wide.....*perlongum*
11. Abdomen with rufous.....*fulvifrons*
(Some of the larger and more rufous individuals are probably males of *perlongum*.)
- Abdomen with no rufous.....*intermedium*
12. Last segment of fourth vein ends about half way toward the wing margin*nigrifrons*
- Last segment of fourth vein extends to wing margin.....13
13. Thoracic and abdominal markings relatively sharply defined; first posterior cell always open.....*americanum*
- Thoracic and abdominal markings relatively less sharply defined.....14
14. Palpi long, clavate; 1st posterior cell usually petiolate..*palpale*
- Palpi usually short, never clavate.....15
15. Palpi 2x width of proboscis, first posterior cell closed or petiolate.....*loveti*
- Palpi 1-1½ times width of proboscis.....16
16. First posterior cell petiolate more than 2x anterior cross-vein.....17
- First posterior cell petiolate less than 2x anterior cross-vein, or open18
17. Size larger, about 5 mm.; legs more reddish; male abdomen with yellow on 2nd and 3rd segments.....*scapulare*
- Size about 3½ mm.; legs dark; male abdomen dark...*parvum*
18. Females.....19
- Males.....21
19. Genital plate long and thin.....*triste*
- Genital plate short and thick.....20
20. First posterior cell open.....*cinereiventre*
- First posterior cell closed.....*abitus*
21. Abdomen with red.....*abitus*
- Abdomen with no reddish.....22
22. First posterior cell closed.....*triste*
- First posterior cell open.....*cinereiventre, triste*



Camras, Sidney. 1944. "Notes on the North American species of the *Zodion fulvifrons* group (Diptera, Conopidae)." *The Pan-Pacific entomologist* 20, 121–128.

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