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The Family Apioceratidae (Diptera) in North America*

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ABSTRACT: Notes on most of the type series, keys to all species, and additional distribution records are given for the known North American species. The following new species of *Apiocera* are described: *trimaculata, caloris, aldrichi, beameri, clavator, interrupta, notata, convergens, martinorum* and figures are given of genitalia and other characters. There are seventeen described species in this family in North America.

IN a recent review of the genus *Apiocera* (4) the writer redescribed the two previously known North American species of this genus and added one new species. Through the kindness of the late Dr. J. M. Aldrich, United States National Museum, it has been possible to study a number of additional specimens representing six new species of this genus. During a recent trip for the study of the types of Bombyliidae† it was possible to examine also all of the type specimens of the family Apioceratidae which still exist in North American museums. A few notes on these have also been included. These records have extended the range of several species and our knowledge of this unusual family. The species described here bring the total number of North American species to seventeen and the total known for the world to twenty-five.

* A study of the material in the Francis Huntington Snow Entomological Museum, University of Kansas, the United States National Museum and several others. This is Contribution No. 415, from the Department of Entomology, Kansas State College.

† The writer is indebted to the directors of the Bach fund for funds to permit the examination of these types. The author is also indebted to the following persons for the loan of personal collections or specimens in their care: Dr. J. M. Aldrich, Dr. R. H. Beamer, Messrs. E. P. VanDuzee, C. H. Martin, J. Wilcox, E. R. Tinkham, F. M. Hull and E. T. Cresson, and to his wife for making the illustrations which are given here.

RHAPHIOMIDAS

A study has been made of a few specimens of each of the described species of this genus and of the types which still exist. The key given below is adapted from Townsend (5):

1. First anal cell open widely ..... *Apomidas trochilus* Coq., 188
   First anal cell closed (*Rhaphiomidas*) 2
2. Abdomen wholly brown, wings with a smoky tinge, antennae blackish. . *episcopus* O. S., 188
   Abdomen not wholly black; wings hyaline, antennae yellowish or reddish, at least on the third joint 3
3. Abdomen almost wholly yellow ..... *zanthos* Townsend, 189
   None of the abdominal segments entirely yellow, the second and fourth each partly yellow, partly blackish 4
4. Ground color of abdomen yellowish, only the front border and a median spot on second to fourth segments blackish; bristles of legs and scutellum yellowish. . *acton* Coq., 188
   Ground color blackish, only the hind border of second to fourth segments yellowish; bristles of hind border of scutellum and middle and hind legs blackish, *mellifex* Townsend, 189

1. *Apomidas trochilus* Coq. (2)*

This species is included in the key on account of its great similarity to *Rhaphiomidas*. The type female in the United States National Museum lacks the antennae and is greasy. It is in all respects like *R. acton* or *xanthos* except in the open first and anal cell. A male intermediate in this character is mentioned under *R. acton*. It appears that this single character is hardly sufficient grounds for generic segregation. No other specimens appear to have been collected or recorded and additional material will probably be necessary before the exact generic status can be determined.

1. *Rhaphiomidas episcopus* O. S. (3) (5)

The type female in the Museum of Comparative Zoölogy is very greasy, but so far as is visible, the identification and description given by Townsend from fresh specimens is correct. The black pile, mentioned by Osten Sacken, on the last three segments consists of restrose hairs similar to those found on female *Apiocera*. The antennae are like those of *acton* in size and shape. There is a female from the Townsend collection in the University of Kansas collection taken at El Taste, Baja Cal., Sept. '95 (Eisen).

2. *Rhaphiomidas acton* Coq. (1)

The type male is in the United States National Museum. The several specimens which have been seen vary considerably in respect to the amount of black on the abdomen. In a typical male

* Numbers refer to literature cited.

specimen the antenna measured first joint, 0.65 mm.; second joint, 0.25 mm.; third joint, 1.85 mm. The third segment is elongate oval in shape.

The following specimens have been seen:

Three males, two females, Cajon, Cal., July 24, 1930 (T. F. Winburn and R. H. Painter, coll.); several specimens "California." A male, Mohave Desert, Cal., July 20, 1930 (C. H. Martin, Coll.), is apparently this species. The first anal cell is narrowly open and in this respect is about half way between the typical *acton* and that in the type of *A. trochilus* Coq. The genitalia and other structures are identical with other males of *acton;* the amount of black coloration on the abdomen is a little less than usual.

3. *Rhaphiomidas xanthos* Townsend (5, 6)

The type of this species was destroyed in the San Francisco fire in April, 1906. There are, however, three males in the Snow collection of the University of Kansas which were received from Townsend and appear to belong to the type series. They are labeled "type" in the same handwriting as are the specimens of *mellifex.* The locality is given as "El Taste, B. C. Sept. (Eisen)." A single teneral male from the type locality is in the National Museum. The type series consisted of one male mentioned at the first of the description and ten others mentioned later. These were said to be from San José del Cabo. The two localities are very close together and it appears that the author designated the town rather than the mountain as the type locality.

The only specimens seen in addition to those reported by Townsend and Colquillett were a male and female, State College, New Mexico, Sept. 23 (W. J. Bearg). The genitalia are different from *mellifez* and *acton,* but the antennae are like the former species in size and shape. In the New Mexico specimen the first joint of the antenna measured 0.5 mm.; second, 0.35 mm.; third, 1.2 mm. The third joint is "flask-shaped" with the neck near the second joint. In one of the Townsend specimens the anal cell is narrowly open in one wing and closed in the other. In both the other specimens it is closed and more or less petiolate.

4. *Rhaphiomidas mellifex* Townsend (5, 6)

The type of this species was also destroyed in the San Francisco fire. In the Snow collection at Kansas University there are two females which apparently belong to the type series. Both are marked

"type" in the same handwriting as are other types in the Townsend collection there. These two specimens are labeled "El Taste, L. Cal., Sept." This locality reference is evidently to a mountain very near San José del Cabo, the type locality mentioned in the original description. In the Snow collection there is also a female, San Jacinto Mts., Cal., 7-21-29 (L. D. Anderson), which is identical with these others except that the third joint of the antennae is a little longer. In this species this joint is like *xanthos*, thus shorter and broader than in *episcopus* or *acton* (text, figure 1).

Genus *Apiocera*

In this genus the males and females sometimes differ appreciably in coloration. The males are easily distinguished either on the basis of abdominal coloration or by the structure of the genitalia. The females of several species, however, look much alike and it is only by comparative study that it has been possible to identify these with certainty. The shape and vesture of the ninth sternite and tergite and of the eighth somite provide excellent characters for distinguishing the males of the several species. These structures are figured for all the North American species. The details of head, thorax and wings appear to present little of use in distinguishing the species. The structure of the vesture was discussed in a previous paper (4). The key given below is an attempt to provide for identification of both males and females where possible. Main dependence must be placed on the structure and coloration of the males for correct determinations (Plate VIII).

KEY TO THE SPECIES OF APIOCERA IN NORTH AMERICA

1. Metapleura with a more or less conspicuous tuft of hair in front of the spiracle.. 2
   Metapleura bare or uniformly short pilose 5
2. Dorso-caudal angle of mesopleura with a tuft of white hair (see also *martinorum*) *trimaculata*, n. sp., 195
   Dorso-caudal angle of mesopleura with three or four strong setae 3
3. Setae of body and legs largely white, hairs of thoracic dorsum white, *caloris*, n. sp., 194
   Setae of body and legs largely black, hairs of thoracic dorsum white 4
4. Abdominal segments 2, 3, and 4 of male banded black and white..*aldrichi*, n. sp., 193
   Abdominal segments 2 and 3 of male spotted black and white or forming irregular bands as in *haruspex* .....*beameri*, n. sp., 198
5. Dorso-caudal angle of mesopleura with three or four strong black setae (see, also, *augur*) .....*clavator*, n. sp., 196
   Dorso-caudal angle of mesopleura bare or slightly hairy..... 6
6. Most of short hairs on mesonotum and male genitalia black in color; setae mostly black 8
   Most of short hairs white on mesonotum, and male genitalia; setae white 7
7. Abdominal spots convex above, straight below; pulvilli usually more than half as long as claws; two black spots on each side in females .....*interrupta*, n. sp., 192
   Abdominal spots quadrate; pulvilli about half as long as claws; three black spots on each side in female .....*bilineata* Painter, 191

8. Dorsum of abdominal segments 3 and 4 in male broadly black 9
Black on segments 3 and 4 of male forming spots 10
9. Male genitalia brown, ninth tergite notched at apex .....*haruspex* O. S., 191
Male genitalia black, ninth tergite not notched at apex .....*notata*, n. sp., 199
10. Thorax mostly gray pollenose; dark brown of abdominal segments not extending across dorsum in male; sometimes almost lacking or confined to two small triangular spots on segments two and three .....*augur* O. S., 192
Thorax brownish pollenose; in male two white stripes the length of the abdomen show conspicuously against the dark brown, three black, subquadrate spots on each side in female .....*convergens*, n. sp., 196
Thorax gray or brownish pollenose; in the male a central black stripe and lateral black stripes constricted or interrupted at the base or apex of segments three and four; usually four triangular spots on abdomen of female.....*martinorum*, n. sp., 197

1. *Apiocera bilineata* Painter (4)

Drawings of the male genitalia of this species are shown on Plate VIII. In studying over the specimens previously reported the long hairs on the ventral lobe of the genitalia have been found to be black in eight specimens, orange-yellow in four and with some of each color in seven specimens. Variation in this character has been found in other species, notably *haruspex* O. S. A male and a female in the Jas. S. Hine collection from Bill Williams Fork, Ariz. (F. H. Snow), appear to be the same species, but both specimens lack the genitalia. In the male the pulvilli are longer than usual for this species and the abdominal stripes are hardly interrupted at the incisures. It is possible that these may represent another species, possibly an undescribed one. One male, White Sands, N. Mex., June 30, 1932, R. H. Beamer collector; two females, White Sands, N. Mex., July 23, 1933 (W. Benedict), in the Kansas University collection, belong to this species. There is also a male in the same collection from Cameron Co., Tex., August 3, 1928, that appears to belong to *bilineata*. It differs from the other specimens in a few minor characters.

2. *Apiocera haruspex* O. S. (3, 4)

This species appears to be the most widely distributed of those in North America. The type has been studied and it agrees with the previous descriptions and the genitalia drawing given here (Plate VIII). Specimens have been seen from the following additional localities:

CALIFORNIA: 1 male, Yosemite, August 3, Hall and Hall coll., in J. Wilcox collection; 1 female, Mt. Wilson, August 30; and 5 males, 1 female, Monrovia Canyon, August 16, 24, 29, 31 and September 1, C. H. Martin collector; 3 males, Beautivista Canyon, July 5, C. H. Martin collector, and in his collection; 1 male, Pasadena, August 1, 1898, Grinnell (United States National Museum); 1 male, Tuolumne Co., Cal., July 29, 1926, E. R. Leach; 1 male, 2 females, San Diego Co., Cal., July, 1891, F. E. Blaisdell; 3 males, Idyllwild, Cal., July 2 to 8, 1928, E. C. Van Dyke; 1 male, Oroville, Cal., July 15, 1926, H. H. Keifer

(Cal. Acad. Sci.). Two males, 1 female, Nipomo, July 24, 1935; 1 male, Cajon Pass, August 1, 1935; 1 female, Indio, August 8, 1935; 2 females, San Diego, August 7, 1935, J. Russell collector; 1 female, Idyllwild, August 3, 1935, E. I. Beamer collector; 3 males, 6 females, Cuyama Ranch, July 23, 1935, J. Russell, Jack and R. H. Beamer, collectors. (In Snow Collection).

IDAHO: One male, one female, Lewistown, August 2, 1912 (U. S. N. M.); five males, three females, Lewistown, Idaho, July 14-22, 1925, C. L. Fox collector.

WASHINGTON: One male, Eastern Washington (U. S. N. M.).

WYOMING: Kahlotus, July 30, 1924, M. C. Lane, collector (J. Wilcox collection).

BRITISH COLUMBIA: One male, Oliver, July 24, 1923, P. N. Broom, collector (U. S. N. M.).

OREGON: Three males, Adrian, July 22, 1934, C. H. Martin, Dorothy Martin.

3. *Apiocera auger* O. S. (4)

The Bembecine wasps, mentioned in the paper (4) as catching specimens of this species, have been determined by Richard Dow as *Stictiella tennicornis* (Fox). Drawings of the genitalia of *A. augur* are shown in Plate VIII. The following additional specimens of this species have been identified:

TEXAS: Presidio, 2 females, July 29, 1928, 1 male, 1 female, August 16, 1929 (E. R. Tinkham collection); 1 male, Fort Stockton, July 18, 1927, L. A. Stephenson collector in Kansas University collection; 1 male, Brewster Co., June 24, 1929, J. B. Parks collector in J. Wilcox collection.

NEW MEXICO: 1 male, Mesilla Park, May 21, Cockerell (U. S. N. M.); 1 male, Eddy Co., N. Mex., July 11, W. Benedict (Snow Coll.).

A male and a female collected by F. M. Hull on Galveston Island, June, 1926, appear to belong to this species. The male genitalia differ only in some details which may be due to position. The abdomen is rubbed but seems to have had the typical pattern. Both sexes, however, have small spines on the dorsocaudal angle of the mesopleura. This is the most easterly record of this family.

4. *Apiocera interrupta*, n. sp.

A pale, white pollenose species with white setae and with lateral rows of six abdominal spots which are straight on the lower and convex on the upper margin. Metapleurae and mesopleurae bare. Genitalia pale brown, similar to *bilineata*. Length, 19 mm.

Male. Ground color, pale brown or yellow; mesonotum and last antennal joint dark brown or blackish. Pollen entirely white with perhaps a trace of a darker pattern on the mesonotum. All setae and pile white except for a little blackish or brownish pile on the underside of the male genitalia. A series of lateral spots commenc-

ing at the second segment and diminishing in size posteriorly are black on segments two to four and brownish on five to seven. These spots are convex above and straight in outline below, but vary somewhat in size and shape. They are in approximately the same position as in *bilineata*. The genitalia are very similar to *bilineata*, differing principally in the shape of the ninth sternite, less acute at the end and with a broader incision on the inner margin. Pulvilli about three fourths the length of the claws, wings hyaline, veins yellow.

Female. Similar to male; retrose hairs on the last four abdominal segments white or yellowish. Spines of ovipositor brown. The black spots on abdominal segments two and three are subquadrate, and there is a trace of a brownish spot on the sides of segment four.

Holotype. Male, Los Angeles, Cal., D. W. Coquillett collection.

Allotype. Female, Los Angeles, Cal., D. W. Coquillett collection.

Paratypes. Male, San Diego Co., Cal., D. W. Coquillett collection. (In United States National Museum, Cat. No. 51432) 3 females, Indio, Cal., August 5, 1935. (Jean Russell and Jack Beamer.) (In Snow collection.)

5. *Apiocera aldrichi*, n. sp.

A robust, densely white pilose and pollenose species with the dorsum of abdominal segments two, three and four jet black in ground color in the male. There is a subtriangular black spot in the female in the center of each side of segments two and three. Setae mostly black. Metapleura with a conspicuous tuft of hair in front of spiracle; dorsocaudal angle of mesopleura with three or four strong setae. Length, 23 mm.

Male. Ground color of body and head black, last two joints of antennae, palpi, first and second tibiae, and abdomen beyond the fourth segment, brownish. Except for the genitalia and parts of the dorsum, the body is clothed with a thick mat of pollen consisting of minute curly hair, and in many places with erect thin hairs. The latter are especially abundant and long on the lower part of the head, coxae and first four abdominal segments. Dorsum of thorax brown pollenose with short brown pile and streaks of gray pollen which form the usual pattern. Setae of body and legs black; of head white.

Abdomen white pollenose; segments two, three, and four with quadrate black spots which are black pilose. In front of each of these, the margin is grayish, behind white. Separated from these

spots and on the same segments are smaller subquadrate blackish spots along the ventrolateral margins of the tergites. Dorsum of segments one and eight brownish. Genitalia brownish, pile black. Wing hyaline.

Female. Similar to male. The pattern on the thorax is less prominent and the body setae are partly white. The abdominal pile is not so long as in the male. Abdomen white pollenose; brownish in center of dorsum with an ill-defined subtriangular spot on each side of segments two and three. A similar spot is faintly visible on segment four. The quadrate spots on the ventrolateral margins of abdominal tergites two, three and four are faintly visible. Segments six, seven, and eight, and apex of five shining brown; clothed with retrose black hairs on fourth and following segments.

Holotype male and *allotype* female, Yuma, Ariz., June 26, 1917, J. M. Aldrich, collector. (In United States Nat'l Museum, Cat. No. 51433.)

Paratypes. Eight males, 1 female, same data as type; 1 male, Indio, Cal., June 6 (Dyar and Caudell); 1 female, Los Angeles, Cal. (collection D. W. Coquillett); 1 female, San Diego Co., Cal. (Coquillett collector); 1 male, S. E. San Bernardino Co., Cal., June 15, 1930 (J. Wilcox collection); 2 males, Florence, Ariz., May 30, 1903 (collection of Acad. Nat. Sci. Phila.); 2 males and a broken female (not a paratype), Bill Williams Fort, Ariz., F. H. Snow (Kan. Univ.); 2 males, four females, Coachella, Cal., May 25, 1928, E. C. Van Dyke; 1 male, Phoenix, Ariz., July 17, 1932, H. Gentry (Cal. Acad. Sci.).

Doctor Aldrich stated that most of his specimens were collected across the Colorado river from Yuma on the California side.

6. *Apiocera caloris,* n. sp.

A more slender, smaller species than *haruspex* or *aldrichi,* but resembling them in general appearance and with different genitalia in the male. Metapleura with a conspicuous tuft of hair in front of the spiracle; dorsocaudal angle of mesopleura with three or four strong setae. All setae largely white. Length, 18 mm.

Male. Ground color of body and head blackish-brown; basal points of antennae, palpi, tibiae, and apical two thirds of abdomen yellowish-brown. Pollen, all pile, and setae of body and head white; a few black setae on tarsi and apex of tibiae. Abdominal segments two, three, and four with central spots bare of pollen and hence appearing brownish or blackish. These spots on segments three and

four occupy most of the dorsum of the segments. On segment two the spot is of the same shape as on this segment of *haruspex* (4, fig. 6) except that the anterior border of white pollen is wider and the posterior border is not interrupted in the center. Genitalia brown, white pilose. Wings hyaline, veins brown.

Female. Similar to male, all pile and hairs, except the retrose hairs on abdominal segments six and seven, white. Abdomen white pollenose a large subtriangle black spot on the center of each side of segments two and three.

Holotype. Male and *allotype* female. Tinijas Altas, Southern Arizona, 1905, W. J. McGee, collector (in U. S. N. M. Cat. No. 51434).

Paratypes. Two females, same data.

All of these specimens have been in liquid (alcohol?) and one female appears to be teneral. The male genitalia are very distinct, however, and the body characters are different from any other species studied. Hence the species should be recognizable even though the specimens from which the description is drawn are poorly preserved and their coloration perhaps not normal.

7. *Apiocera trimaculata,* n. sp.

A densely white pilose, white pollenose, species with three somewhat diamond-shaped, black spots on abdominal segments two, three, and four. A tuft of hair on the metapleura in front of the spiracle, another which is not intermixed with setae on the mesopleura in front of the wings. Setae except on the tarsi white. Length, 17 mm.

Male. Ground color black, palpi yellow, tarsi and genitalia brownish. Clothed throughout with white pollen; a faint pattern of brownish pollen on the mesonotum. Pile white, especially dense on the abdomen, front coxae, and lower part of head. The pile is partly black on the black abdominal spots. These latter are as follows: segment two, with a central diamond-shaped spot with a triangular one attached on each side by the apex to the central spot; segment three, a central diamond-shaped spot occupying most of the dorsum of the segment; segment four, a smaller diamond-shaped spot. In addition, on the ventrolateral margins of segments three and four there is an indistinct ovoid black spot; a similar one shows very faintly on segment two. Genitalia white pollenose and pilose; notch on the tip of the ninth sternite a little more pronounced than in *caloris,* which it resembles.

Holotype. Male, San Diego Co., Cal., collection of D. W. Coquillett. (In United States National Museum, Cat. No. 51435.)

The species is most closely related to *caloris,* but in genitalia and other characteristics it is distinct.

8. *Apiocera convergens,* n. sp.

A moderately pilose species with two white pollenose stripes which converge on segments five and six and show conspicuously against the black and brown abdomen of the male. Metapleura bare, mesopleura with thinly scattered hairs, genitalia and femora mahogany brown. Setae black. Length, 18 mm.

Male. Ground color black; palpi yellowish, antennae, femora and posterior part of abdomen dark brown, tibiae light brown. Pile, white, the short hairs on thoracic and abdominal dorsum, and on genitalia, black. Pollen white, with grayish-brown patterns on the thoracic and abdominal dorsum. The abdominal pattern is complicated. A slender central triangle with its base on segment two, and apex on segment five, has the base of each segment brownish, the apex of each one black, and is interrupted at the extreme apices of segments two and four by a narrow white band. This central triangle is separated from two rows of conspicuous black lateral spots by a white stripe on each side. These spots are subquadrate and become progressively larger from segment two to four, and smaller from segment five to seven. There is in addition faint blackish stripes on the extreme ventrolateral margins of the tergites. The remainder of each segment is white pollenose. Pulvilli about as long as the claws. Wings hyaline, veins brown.

Female. Similar to male, but abdominal pattern apparently confined to subquadrate black spots on the sides of segments two, three and four. (The specimens are greasy and rubbed.) Retrose hairs on last three abdominal segments, and those of the dorsum of thorax and abdomen black.

Holotype. Male and *allotype* female, "Cal.," C. W. Riley collection. (In United States National Museum, Cat. No. 51436.)

Paratypes. Male and female, same data.

The male specimens were labeled *Apiocera haruspex* O. S. by Coquillett.

9. *Apiocera clavator,* n. sp.

A small species resembling *bilineata* and *interrupta* in abdominal markings, but darker, and with entirely different genitalia. Meta-

pleura bare; mesopleura with a tuft of black setae in front of the wings. Pulvilli about two thirds as long as the claws. Setae of body mostly black. Length, 16 mm.

Male. Ground color black or very dark brown, palpi yellow, tibiae and tarsi light brown. (Third joint of antennae missing.) Pollen white on head, and below the level of the wings; brownish-gray on mesonotum and abdominal dorsum, but lighter in color along the apices of the segments. Pile is white on the parts that are white pollenose, black on the mesonotum, abdominal dorsum, genitalia, tibiae, and tarsi. Setae black, except white on head, femora, and coxae. The velvety black abdominal spots on each side of the second to seventh segments are subquadrate, but somewhat convex above. The one on the fourth is the largest; they diminish rapidly in size on the segments caudal to the fourth but to a less extent cephalad. There are faint oblong spots on the ventrolateral margins of tergites two to five, brownish in color and largest on segment four. Wings hyaline, veins brown. Genitalia much shorter than in the other species.

Holotype. Male, state of Colima, Mexico, L. Conradt, collector. (In United States National Museum, Cat. No. 51437.)

10. *Apiocera martinorum,* n. sp.

A moderately pilose species with five blackish spots on each of the segments two, three and four in the male. On segment four these tend to coalesce. Metapleura and mesopleura pilose, the pile on the former frequently reduced or absent. Genitalia and tibiae brown, setae mostly black. Length, 19 mm.

Male. Ground color black; palpi yellowish, tibiae, tarsi, genitalia, and posterior margins of last three segments brown. Pile white, except the short hairs and pile on the metanotum, genitalia and the black spots on the abdomen which are black. The setae on the antennae, head, and prothorax white. Pollen white with grayish pattern on the thoracic and abdominal dorsum. On the abdomen the pattern is as follows: first segment brownish with two white spots on each side; second segment brownish at base, to which the four blackish spots are more or less connected; the remainder of the segment white; third segment with the four spots separated by white pollen; on the fourth segment the inner lateral spots are broader at the apex and almost unite with the others on this margin of the segment. The last three segments white pollenose with a central

brown dorsal spot which may be due to being rubbed. Pulvilli about as long as claws. Wings hyaline, veins dark brown.

Female. Similar to male, but abdominal pattern consisting of a subtriangular black spot on the center of each side of segments two and three, and an indistinct spot in the same place on four. There are also indistinct stripes on the extreme ventrolateral margins of the tergites. The first two antennal segments and femora brownish, the tibiae and last three abdominal segments light brown. Most of the pile and hair on the first four abdominal segments white.

Holotype. Male, Adrian, Ore., July 22, 1932. Dwylee river sand dunes, Dorothy Martin, collector. (In C. H. Martin collection.)

Allotype. Female, Adrian, Ore., July 21, 1934. C. H. Martin, collector. (In C. H. Martin collection.)

Paratypes. Seven pairs, 21 females, 66 males. Adrian, Ore., July 22, 24, 25, 31, Aug. 4, 11; Roswell Bench, Parma, Idaho. Aug. 4, 5, 1934. (Chas. H. and Dorothy Martin.)

In the male, segment four of the abdomen is sometimes almost entirely black; there is variation in the size and shape of the black spots. The genitalia of the male differs from that of *convergens* in various proportions and in the presence of a distinct notch at the apex of the ninth tergite. In both sexes there is considerable variation in the distribution of the black and white setae and in the amount of pile on the metapleura. The female differs from those of both *haruspex* and *augur* by having the black spots near the center of the sides of the segments rather than at the posterior angles. The female of *convergens* has subquadrate, rather than subtriangular spots. This species is named for the collectors—Dorothy and Charles H. Martin.

11. *Apiocera beameri,* n. sp.

Abdominal pattern of male similar in pattern to that of *haruspex* from which it differs in characters of genitalia and in the presence of a tuft of hair on the metapleura in front of the spiracle and several setae on the dorso-caudal angle of mesopleura. Length, 22 mm.

Male. Ground color of body and head black, antennae, palpi, tibiae, and abdomen beyond segment four dark brown. Body and head, except genitalia and parts of dorsum, clothed with a thick mat of pollen or minute curly hair. Palpi, front, prothorax, coxae, femora, and abdomen clothed with erect thin, white hairs. Dorsum of thorax grayish and brown pollenose, forming the usual pattern. Setae of head white, of coxae mostly white, of thorax mostly black,

of femora and tibiae black. Abdomen white pollenose; bare, black spots on the dorsum forming a pattern similar to that of *haruspex;* segment one brownish in the center and along the posterior margin; segment two brownish on the anterior border, the black crossband expanded broadly in the center to the posterior border and also expanded laterally, the remainder of the dorsum snow white; segment three mostly black, the anteriolateral and posteriolateral margins brownish; segment four black, the anterior margin narrowly brownish, the posterior white. Segments five, six, and seven mostly white. A quadrate black spot on the ventrolateral margins of tergites two, three, and four. Genitalia dark brown, pile black. Wings hyaline.

Female. Almost identical with *aldrichi.* The single female available is somewhat greasy. There appears to have been a black triangular spot on each side of segment four as well as on segments two and three. The retrose hairs on the fourth and following abdominal segments are mostly white where in *aldrichi* they are mostly black.

Holotype. Male, Cuyama Ranch, California, July 25, 1935 (R. H. Beamer), in Snow collection.

Allotype. Female, Cuyama Ranch, California, July 25, 1935 (R. H. Beamer), in Snow collection.

Paratype. Male, Cuyama Ranch, California, July 25, 1935. (Jack Beamer), Snow collection.

This species is closely related to *aldrichi,* but has a different abdominal pattern in the male and different male genitalia. The species is named in honor of the collector, Dr. R. H. Beamer.

12. *Apiocera notata,* n. sp.

Abdominal pattern of male similar to that of *haruspex,* from which it differs in having the genitalia black and lacking the notch on the ninth tergite. Length, 20 mm.

Male. Ground color black to very dark brown; palpi, tibiae, and tarsi lighter brown. Head and lower parts of body and femora gray pollenose, thinly white pilose, dorsum of thorax and scutellum brown pollenose, short black pilose with streaks of grayish pollen forming the usual pattern. Setae of head and four front coxae mostly white, of remainder of body and legs black. Abdomen gray and brown pollenose with black bare spots which form a pattern similar to that of *haruspex.* First segment brown pollenose lighter on each side, darker in center, a tuft of white pile at the anterior corners and of black pile at the posterior corners; second segment brown pollenose

on the anterior margin, white on the posterior margin, separated by three connected black triangles; third segment with two brown spots along the anterior margin, the remainder black; fourth segment black with two small white spots on the anterior margin; fifth and sixth white pollenose, seventh mostly brown pollenose on the dorsum; laterally the usual three quadrate black spots, that on the fourth joined to the black band posteriorly. Most of the pile of the abdominal dorsum short, black. Genitalia blackish to dark brown, pile black. Wings hyaline.

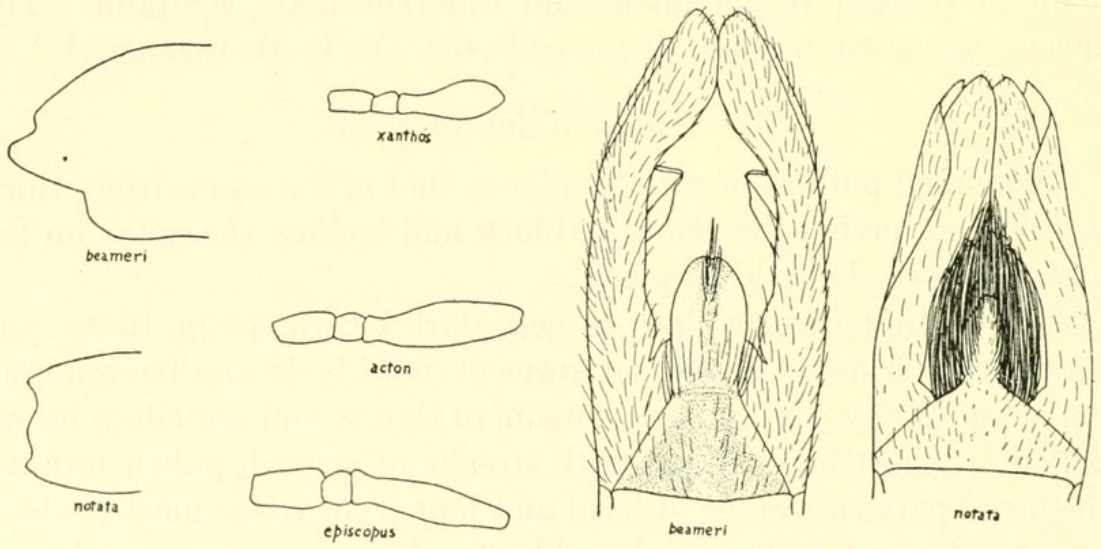
Female. Almost identical with the female of *haruspex.* In the single specimen at hand the triangular black spots on the abdominal segments are larger than usual in *haruspex* and on segments three and four are confluent with the black quadrate spots on the ventrolateral margins of the tergites. Segments seven and eight are much darker in ground color than usual with *haruspex,* the knob at the apex of eight is black rather than brown.

Holotype. Male, Campo, Cal., August 10, 1935 (E. I. Beamer), in the Snow collection.

Allotype. Female, Campo, Cal., August 10, 1935 (Jean Russell), in Snow collection.

Paratypes. Two males, same locality and date (E. I. Beamer and Jean Russell, collectors), in Snow collection.

This species is related to *haruspex,* but the genitalia of the male is very different.



TEXT FIGURE I. Ventral aspect of genitalia and lateral aspects of apices of the ninth tergites of *Apiocera beameri* and *notata.* Lateral aspects of antennae of *Rhaphiomidas xanthos, acton* and *episcopus.*

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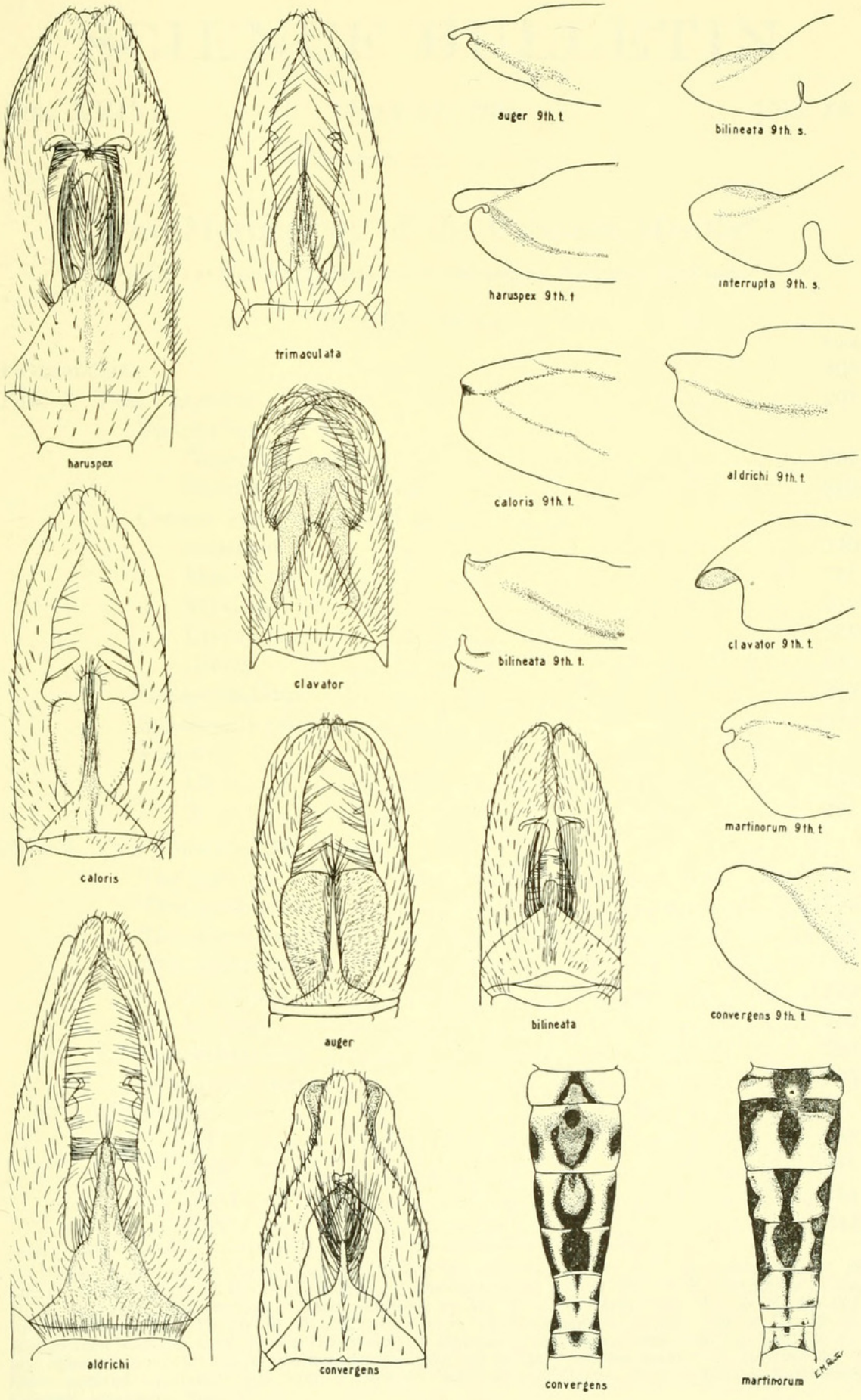
PLATE VIII

Ventral aspect of genitalia of *Apiocera aldrichi, caloris, haruspex, convergens, clavator, trimaculata,* and *bilineata* and ventrolateral aspect of the ninth sternite of *interrupta* and *bilineata.* Lateral aspects of the ninth tergites of *bilineata, caloris, haruspex, augur, convergens, martinorum, clavator* and *aldrichi.* Diagrams of the dorsal abdominal pattern of *convergens* and *martinourm.* All the genitalia drawings are made at the same magnification, except that of the tip of the ninth tergite of *bilineata.*

PLATE VIII


haruspex
trimaculata
auger 9th. t.
bilineata 9th. s.
haruspex 9th. t
interrupta 9th. s.
caloris 9th. t.
aldrichi 9th. t.
bilineata 9th. t.
clavator 9th. t.
martinorum 9th. t
convergens 9th. t.
caloris
clavator
auger
bilineata
aldrichi
convergens
convergens
martinorum