9-12-1953

Studies in Great Basin Bombyliidae

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Recommended Citation
Johnson, D. Elmer and Maughan, Lucile (1953) "Studies in Great Basin Bombyliidae," _Great Basin Naturalist_: Vol. 13 : No. 1 , Article 5. Available at: https://scholarsarchive.byu.edu/gbn/vol13/iss1/5

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Over a period of a good many years the senior writer has been sporadically collecting Bombyliidae, mostly in the Great Basin areas of California, Idaho, Nevada, and Utah. During the process of classifying this material the writers have discovered a number of apparently new species. The descriptions of three of these are given here, together with notes and further descriptions of one species described a number of years ago from this area. Types and paratypes are in our collection, except where otherwise noted.

The writers wish herewith to express their gratitude to Dr. R. H. Painter, Kansas State College, for his many kindnesses and technical assistance over the years; and to the staff of the department of Zoology and Entomology, Brigham Young University, for their aid and encouragement, and for their kindness in extending to us the use of their facilities, without which our studies would have been impossible.

OESTRANTHRAX Bezzi

While collecting Bee-flies in the area east of Delta, Utah, the senior writer discovered a large white species with which he was not familiar. These flies were swift, noisy fliers, which hovered over the open areas or came to rest on stems of dead sage. It was soon discovered that they were extremely difficult to capture and it was discovered with the first capture that their vesture was most easily abraded. In fact, in spite of every precaution, only a very few specimens of those taken were in anywhere near perfect condition. Also, very shortly after they were pinned they began to go greasy. Before any detailed study could be made they all had to be degreased, which was done in ether.

In attempting to determine the generic standing of these interesting flies in Curran’s Families and Genera of North American Diptera we ran it to couplet 16: Proboscis projecting far beyond oral margin; or Proboscis not at all projecting. It was not until checking for the character of the mouthparts that it was discovered that no mouthparts existed—tiny vestigial remnants being all that remained. We
are indebted to Dr. R. H. Painter for ultimately determining that the specimens belong in the genus *Oestranthrax* Bezzi. Insofar as we are able to ascertain this is the first discovery of a species of this Eastern genus from the Western Hemisphere, the species described here-tofore having come from Africa, Dagistan, and Asia Minor. The genus belongs in the subfamily *Exoprosopinae*, and is characterized by vestigial mouthparts, receding face, long-conical third antennal segment without differentiated style, eyes with a short un-faceted stripe, weak spines on the fore tibiae, claws of fore tarsi little if any smaller than the others, no teeth on claws, pulvilli wanting, wing much like *Villa*, abdomen cylindrical.

**Oestranthrax Farinosus** Johnson and Maughan, n. sp.

Brownish yellow species, wings hyaline, mouthparts vestigial, thoracic and scutellar bristles absent. Length: 15-18 mm.

**Male:** Head yellow, brown at vertex, densely snowy white tomentose and pilose on face and front, long narrow scales on occiput, ocellar tubercle naked. Face receding, narrow oral groove contains rudiments of mouth parts, a genal groove on each side one third of the way between bottom of eye and base of antenna. Antennae light yellowish brown, second segment sightly darker than the other two, third segment long-conical; first segment twice as long as second, second about two thirds as long as broad, third nearly twice as long as first two combined. Tufts of long white tomentum on first segment, shorter tomentum on second, third whitish pollinose.

Thorax dark brown above, yellowish brown laterally and ventrally. Anterior half of mesonotum and posterior margin with dense white pile, between which areas is a cross-band of pale tomentum, faun colored at sides, nearly white in the middle. Pile at sides of this band is faun colored. Scutellum reddish brown, tomentum at base pale yellowish, whitish apically. Pleurae yellowish with white pile. Wings hyaline, extreme base, costal, and subcostal cells yellowish, veins pale brown. Base of costa with white scales, yellowish distally, hairs yellowish. Halteres pale brown, knob yellow. Legs yellow, femora with a band of brownish near distal third. Spines weak, pale yellow, tomentum white, femora with a few short hairs.

Abdomen yellowish brown, first segment broadly and rest narrowly darker in the middle, densely clothed with white tomentum, hind third of segment three somewhat less dense tomentose, in some
specimens the ground color showing through producing the effect of pale yellowish cross-bands. Segment one densely white pilose, a small amount of white pile on the basal center of segment two, a very little on the lateral margins of six and seven, almost completely obscured by dense tomentum. Venter yellow, first segment short white pilose others densely white tomentose. Genitalia with yellowish hairs.

Female: Much like the male. Third antennal segment longer and less pointed than in the male. Pile of collar faintly tinged with yellow, pile and tomentum of scutellum and first abdominal segment yellowish, posterior half of segments two and three faun-colored, sides of four paler, dorsal center of five same faun color, giving a banded appearance to the abdomen. Female abdomen more pointed than that of male.

Holotype male, Allotype female, Delta, Utah, July 5, 1943, D. E. Johnson collector.

Paratypes: Two males, July 4, 1943, nine males and two females, July 5, 1943, D. E. Johnson.

The tomentum of this insect is composed of closely appressed, mostly very dense, extremely delicate scales. In life these flies appear to be dazzling white, and have the appearance of having been dipped in flour, hence the name. Before dying the eyes were a coppery red, but now in most specimens have turned dull brown.

The area in which this species was collected is the eastern edge of the Pahvant Valley in Central Utah, between the town of Delta and the foothills to the east. The terrain is somewhat broken, with intermittent areas of sand and loam. The dominant vegetation is sagebrush and greasewood, under which are more or less scattered weeds and native grasses. The sandy areas were prolific producers of many kinds of Bee-flies, the loamy areas nearly barren. It was, however, in these latter areas that these flies were found. They were found nearly always resting near the ground on dead twigs or stems, their pale color blending well with the weather whitened wood. Most of the specimens seen were located by walking into the sun and watching for the glint of sunlight on the heads and epaulets of white scales on the wings of the flies. Their capture was very uncertain. Their darting flight is extremely rapid, even for the notoriously fast bee-flies, and they are more wary than many of the species collected. However, as is common with many species of the family,
they not infrequently returned to the same general locality when, disturbed. On the two days on which they were encountered they were far from rare. But the difficulties of their capture were such that several hours of hard work produced only fifteen specimens, and most of these are more or less rubbed. Because of their choice of resting places on dead and usually scraggly bushes, and because a very light net was being used they usually had to be collected in flight. Their vesture is so extremely delicate that even this light net abraded them. Whereas at this time this species and many others were abundant in this general area, a visit a year later to this same place produced not a single specimen of *farinosus* and practically none of any other species either. The area has not been visited since.

**BOMBYLIUS PALLESCENS** Johnson and Maughan, n. sp.

Male: Ground color black. Femora dark brown basally, shading to red, darker distally; tarsi red basally shading to black. Face yellowish brown, roundly produced, brownish to golden pollinose; oral pile dense, pale golden, rest of pile of face less dense, black. Front black pilose, with patch of appressed golden tomentum on each side terminating in black tomentum on a line from antenna to eye. Eyes contiguous about one third the distance from ocellar tubercle to antennae. Antennae black, first segment two and one half times as long as second, wide as second is long; second segment about as long as broad; third segment long lanceolate, widest near the base, one and one half times as long as the first two combined; short pointed style. Pile of antennae black, long on the first, short on the second segments, several short hairs on the upper side of the third. Occiput pollinose, pale yellow pilose, a row of short black hairs behind the upper orbits. Venter of head white pilose, palpi black pilose.

Dorsum of thorax and abdomen grayish yellow pilose, usual thoracic bristles yellow. Lateral hind margins of abdominal segments except first with a few black hairs. Venter of abdomen and tuft under wing with same color of pile, rest of pleurae, pectus, and coxae paler. Pile of genitalia more yellowish than general color. Sparse pile along under side of femora long, yellowish white, heavy bristles black, smaller ones mixed black and red on hind femora, black on hind tibiae, tarsi, and other legs; a row of dark scales on front of fore femora. Wings dark basally, gradually evanescent, the dark area extending to the tip of the first vein and across wing through
base of fourth posterior cell; veins brownish. Short hairs at base of costa black on leading edge, with a patch of pale hairs above and basally. Stalk of halteres pale brown, knob brown. Length without proboscis 9-10 mm., of proboscis 7-9 mm.

Female: Much like the male. Oral pile less dense, front heavily golden tomentose, somewhat paler in center and at sides of ocellar tubercle. Pile of front and ocellar tubercle mixed black and yellow, occiput with appressed, hair-like tomentum. Hairs along posterior orbits which are black in the male are mostly pale in female. Dorsum with central stripe of appressed hair-like tomentum commencing at about the anterior third of the mesonotum, extending across scutellum and full length of abdomen. Hind margins of tergites two and following with a row of scattered black pile, more black pile on sides of segments. An indistinct band of dense appressed hair-like tomentum on hind margins of segments two to five. Venter obscured by the same type of tomentum. Legs red, knees black, pile and tomentum pale except narrow line of black scales on front of fore femora, bristles black. Wings somewhat paler than in male.

Holotype (male), May 12, 1944, Herlong, California, D. E. Johnson.

Allotype (female), May 14, 1944, same locality.

Paratypes: Seven males and six females, May 7-14, 1944, same locality. (Herlong, California, is not shown on any of the maps we have seen. It is the site of the Sierra Ordnance Depot, situated in Lassen County five or six miles south of Honey Lake and about six miles north east of the small village of Doyle.)

This species is known to us from the type series only, therefore the amount of variation is unknown, except that in this series the length of the proboscis varies from slightly longer than the length of the head and body to only about four-fifths as long. The specimens are remarkably uniform in size and color.

This species appears to be most closely related to fascialis Cres- son, from which it may be separated by the more dense oral pile, the pollinose face, presence of golden tomentum above antennae, lack of tomentum on abdominal dorsum of the male, and generally paler color of vesture. It differs from lancifer O. S. in having the pollinose face, dense mystax, golden scales of front, no dark line of pile from base of wing onto occiput, paler wings, and much less black pile on abdomen.
CONOPHORUS SACKENII Johnson and Maughan, n. sp.

Black, entirely opaque. Length $6\frac{1}{2}$ to 12 mm.

Male: Frontal triangle, face and lower occiput grayish, upper orbits brownish pollinose, fading into gray behind and below. Pile of face black, a few yellowish white ones along oral margin, purer white below. Pile of palpi white, except for a few black hairs on tip. Pile of ocellar tubercle black, a row of long black pile behind orbits, rest of pile of occiput white except for a patch of black opposite bases of antennae. Scattered long pale yellowish hair-like tomentum on occiput, most dense in patch of black pile. First segment of antenna nearly cylindrical, one third as wide as long, one and one fourth times as long as other two combined; second cylindrical, twice as long as wide, third segment broad lanceolate tipped with two-jointed style of which the first is as broad as long, the second the same length but hair-like. Antennae faintly brownish gray pollinose, first and second segments with long black pile above, short black pile on outer sides, and long mixed black and white pile below; scattered pale yellowish white tomentum above and below, none laterally. Proboscis reaches to middle of second antennal segment.

Mesonotum faintly grayish brown pollinose fading to gray forward and laterally, pleurae gray pollinose. Pile of mesonotum mostly black, some white hairs forward and at sides, longer behind and on humeri, bristles black. Scattering of fine hair-like pale yellow tomentum, more dense on rear of disc. Pile of scutellum long and black, scattered tomentum pale yellow. Mesopleura with patch of white pile, pectus and coxae white pilose. Femora and tibiae yellowish white tomentose and long black and white pilose below. Tarsi reddish at first two joints, spines of tibiae and tarsi black. Wings translucent, tinged with black, which is faintly darker along the veins and almost opaque along the front of the wings, especially in costal, subcostal, and base of marginal cells, darker spots on bases of first and fourth posterior cells. Stems of halteres light yellowish brown, darkening basally, knobs dark brown. Pile at the base of the costa mostly black, with a few light colored ones at very base. Costa not denticulate. Alulae pale yellow with whitish hairs.

Abdomen faintly brownish pollinose dorsally, lighter at sides; densely yellowish white pilose on first segment at sides with a row of long black hairs on hind margin. Most of rest of abdominal pile black on dorsum, short and sparse except for a row of long hairs on hind margin of each segment, mixed long black and short, more numerous
white pile on sides; light colored tomentum dorsally. Pile of venter mixed black and white, mostly white on front half, mostly black on posterior half. Entire venter covered with grayish white tomentum; ground color of hind margins of segments one to five narrowly pale yellow.

Female. Much like the male except there is less black pile generally, much more tomentum on the abdominal dorsum, more pile on occiput, dorsum of thorax, and abdomen, and the abdomen is broader than that of the male. Front is grayish pollinose below,

EXPLANATION OF THE FIGURES

1. Wing of Conophorus sackenii n. sp.
2. Side view of head of Oestranthrax farinosus n. sp.
3. Side view of head of Conophorus sackenii n. sp.
4. Wing of Poecilanthrax painteri Maughan.
5. Ventral aspect of head of Oestranthrax farinosus n. sp.
6. Wing of Oestranthrax farinosus n. sp.
7. Antenna of Bombylius pallescens n. sp.
8. Wing of male, Bombylius pallescens n. sp.
9. Antenna of Conophorus sackenii n. sp.

shading to brownish above, narrowly bare in middle, covered on sides with long black pile and long, sub-appressed, grayish yellow hair-like tomentum.

HOLOTYPE (male), ALLOTYPE (female), Herlong, California, May 14, 1944, D. E. Johnson.
Paratypes: Five males, two females, same data; one female, May 12, 1944, same locality, our collection. In addition the following specimens in other collections are designated as paratypes:

California Academy of Science: one female, Gold Lake, Cal., Sierra Co., July 13, 1921, C. L. Fox; one female, San Francisco, Cal., May 22, 1915, M. C. Van Duze; one male, one female, Yosemite Valley, Cal., VI-10-1921, E. P. Van Duze.


Museum of Comparative Zoology: one male, one female, Wallace, Idaho, VI-4, Huelleman.


In addition to the type series eight specimens have been studied which are undoubtedly this species, but which are in too poor condition to include in the type series.

University of California: one female, G. Alpine Crk., Tahoe, Cal., 7-3-15.

University of California at Los Angeles: one male, Sardine Creek, Mono Co., 8500 ft., VI-28-51, E. L. Silver.

Utah State Agricultural College: one male, Logan Canyon, Ut.,
June 24, 1949, Wilford J. Hanson; one male, Logan Canyon, Ut., 6-20-37, Wm. P. Nye.

J. C. Hall Collection: one female, Colfax, Calif., 5-29-52, S. Miyagawa; one male, Strawberry, Tuolumne Co., Cal., VI-23-51, C. A. Downing.

Museum of Comparative Zoology: one male, Yosemite, June 19, Osten Sacken.

Academy of Natural Sciences of Philadelphia: one male, Silver Lake, Utah, H. Skinner.

Variations: Besides differing in size these flies vary in the amount of pile and tomentum, especially on antennae and abdomen, and of black pile on sides and occiput. There is some variation in the shape of the third antennal segment. Color of tomentum of abdomen varies from pale grayish yellow to golden. There is considerable variation in the amount of black pile, varying on the abdomen from mostly yellow to mostly black. The wings vary in general color from brown to nearly black. In the specimens from Canada, Idaho, and Buck’s Lake, California, the third antennal segment is not quite as broad as in the other specimens, and the veins of the wings more distinctly bordered with darker color. It is thought that this is intraspecific variation, but may represent a different variety or species.

This species was partially described but not named by Osten Sacken (Western Diptera, p. 262¹). We have examined his specimen, which is in the Museum of Comparative Zoology, and in all characters remaining intact it seems to agree with the other specimens we have seen. The species runs to couplet five in Coquillett’s key (Coq. 194, pp. 101-102²), but fails to agree with either statement. It can be separated from all other described species of North American Conophorus by the distinctive shape and proportions of the antennae. In addition to this character it can be separated from melanocerata Bigot by the abundant black pile; from serrata Coq. by the lack of denticulation of the male costa; and from atratula Loew by the opaque scutellum and the dark knobs of the halteres.

We originally drew up the description of this species from the ten Herlong, California specimens, but Professor Ralph B. Priddy, University of Pittsburgh, sent us thirty three additional specimens

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which he had borrowed for study. We wish to express our gratitude to Professor Priddy for this courtesy, the longer series giving a much more complete picture of the variation and distribution of the species. In various collections this species has been determined as *melanocerata* Bigot.

**POECILANTHRAX PAINTERI** Maughan

This species was described from females only (Maughan, 1935\(^1\)). Since that time the male has been collected and we are taking this opportunity to describe it.

**Male:** Slightly darker in general appearance than the female, due to more color in the wing and more black pile on the abdomen. Black, except for face, lower front, and first antennal segment, which are yellow, scutellum red dorsally, legs partly dark red, first three abdominal sternites partly reddish yellow, and spots of red laterally on tergites two and three.

Face moderately produced, with scant cinereous and black pile, proboscis scarcely projecting (in the description of the female the light colored pile was referred to as yellow, but cinereous more nearly characterizes it). Occiput with scant fine cinereous tomentum; front and first two antennal segments sparse black pilose, front very scant yellowish tomentose.

Pile of front of thorax buffy, of rest of thorax cinereous, with very scattered short black pile on rear of mesonotum and on scutellum; tomentum of thorax cinereous with a slightly golden tint, except for black tomentum on disc of scutellum. Bristles yellowish, pleurae and coxae cinereous pilose. Legs black, tibiae and apices of femora of middle and hind legs dark red. Tomentum metallic tan, appearing red to black, depending on light. Wings with costal and subcostal cells light brownish, and all the veins narrowly bordered with brown, cells slightly infuscated. Halteres with stem light brown, knobs yellow.

Abdomen densely cinereous pilose at sides with a large tuft of black in the lighter pile on hind margin of each segment from two to six, apex of seven moderately black pilose with some cinereous. Dorsally a triangle of black tomentum with its base to hind margin of segment is found on two to five; the triangle is nearly as wide as segment on two, about one fifth as wide on three, and narrower on

four and five. Rest of tomentum cinereous. Pile of dorsum is all sparse, cinereous, with band of black across hind margin of each segment. Venter cinereous pilose and tomentose with a very little black pile on segments five and six, and considerable mixed with the lighter on seven. Pile of genitalia black. Length; 12-14 mm.

**Allotype** (male), Blacksmith Fork Canyon, Cache Co., Utah, June 30, 1944, D. E. Johnson.

**Paratype** (males), one, same data; five, Lava Hot Springs, Idaho, June 27, 1948, D. E. Johnson.

Variation: Pile of face varies from almost all black to about half light, half black; tongue of black color extending into yellow on front of female is present in some males, reduced or absent in most specimens; first three abdominal sternites sometimes wholly yellow, parts of following three sometimes also yellow; only second tergite red laterally in some specimens. On dorsum of abdomen black tomentum is to be found on segment six as well as two to five in two specimens, and only on segments two and three in one other.