

NOTES ON THE GENUS *BOMBYLIUS* LINNAEUS IN UTAH,
WITH KEY AND DESCRIPTIONS OF NEW SPECIES
(DIPTERA: BOMBYLIIDAE)

D. Elmer and Lucile Maughan Johnson¹

ABSTRACT.— A key to the Utah species of *Bombylius* is presented. *Bombylius heximaculatus*, *nigri-ventris*, *montanus*, *abdominalis*, *aestivus*, and *auriferoides*, new species, and *lancifer kanabensis*, subspecies new, are described from Utah. *Bombylius lassenensis*, new name, is proposed to replace the preoccupied *B. pallescens* Johnson and Maughan.

The first comprehensive paper on Utah *Bombyliidae* (Maughan 1935) lists six species in the genus *Bombylius* Linnaeus, with the identity of a seventh left in doubt because of the small amount and poor condition of the material available for study. Additional collecting of specimens in good condition showed this species might be *B. clio* Williston, but the specimens are not well enough preserved to include in our present key. The alternate species, *B. fascialis* Cresson, has been collected in abundance by us. These results were published in a subsequent paper (Maughan and Johnson 1936). Still further collecting has added much to our knowledge of this genus as it occurs in the northern Great Basin area of Utah, but its status in the southern Great Basin and in the Colorado River drainage system is still little known. We feel, nevertheless, that publication of our available information at this time is worthwhile as it may stimulate future collectors to study this group of flies. In this paper we discuss briefly the forms previously known to occur in the state, describe seven new taxa, and present a key for their identification. In addition, we use this opportunity to give a new name to the homonym *Bombylius pallescens* Johnson and Maughan.

A large part of the work on this paper was completed eight to ten years ago. Unfortunately, changing circumstances and the illness and death of Elmer Johnson slowed progress on its completion. We had completed the key and most of the descriptions prior to that time. In May

1975 I (Lucile) assumed the responsibility, in cooperation with Dr. Vasco M. Tanner of Brigham Young University (BYU), of completing this paper so it could be published. I have completed the remaining species descriptions and revised the paper where it seemed advisable.

The holotypes, allotypes, and paratypes dealt with in this paper are in the Brigham Young University entomological type collection.

The extensive collection of bee flies which we built up over the past 40 years has been transferred to Brigham Young University where it has been carefully curated by Dr. Tanner and his associates and is available for study. Many of the genera represented in the collection include apparently undescribed species which will hopefully be the subject for further research. Much of our collection over the years and all of the types we have named in other genera were previously deposited in the Brigham Young University Life Sciences Museum.

Nearly all of the material dealt with in this paper is from Utah, with a few specimens from neighboring states, largely collected by Mr. Johnson, some by both of us, and a few by other collectors.

Sincere thanks are expressed to those who have aided and given encouragement toward the completion of this paper: to our family; especially to Dr. Tanner for his advice and active assistance in caring for our collection; and to Mrs. Reginald H. Painter, who has been a source of strength and inspiration.

Key to the Species of *Bombylius* Discussed in this Paper

1. Wings with the anterior half brown or blackish, this colored area with a sinuous and sharply defined posterior margin *major* Linnaeus

¹117 I. Street, Salt Lake City, Utah 84103. D. Elmer Johnson died 30 September 1973.

	Wings with brown area not sharply defined, nearly hyaline, or spotted	2
2(1).	Wings with five to seven distinct dark spots on veins and crossveins in hyaline portion	3
	Wings at most faintly spotted on veins and crossveins other than the r-m crossvein and free part of vein Cu ₁	4
3(2).	Wings with dark spot near distal end of vein R ₂₋₃ ; heavily tomentose, female with golden tomentum on front; usually in the mountains or foothills <i>albicapillus albicapillus</i> Loew	
	Vein R ₂₋₃ without dark spot near its end; sparsely tomentose, female with pale yellowish tomentum on front; usually found in the foothills and valley floors <i>heximaculatus</i> n. sp.	
4(2).	Face prominent, facial pile wholly black	5
	Face pollinose, facial pile at least in part pale	11
5(4).	Pile of dorsum mostly pale yellow to golden; legs except bases of femora and spots on knees yellow; female with large trapezoidal area on front shining; both sexes with median line of pale tomentum on abdominal dorsum; halteres pale brown to yellow	
 <i>fascialis</i> Cresson	
	Pile of dorsum not as above; usually with a more or less prominent line of brown or black hairs extending from base of wings forward onto occiput	6
6(5).	Males	7
	Females	9
7(6).	Pile of venter black, that of dorsum pale gray; no tufts of black pile on sides of abdomen visible from above; relatively large species (9-12 mm); frequents the foothills <i>nigriventris</i> n. sp.	
	Pile of at least first three ventral abdominal segments pale; tufts of black pile on sides of abdomen visible from above	8
8(7).	Pale pile of dorsum dark yellowish gray, always several on posterior callosities black; line of dark hair from wing onto occiput usually broad and prominent; prominent tufts of black pile on hind angles of second and third terga; band of black pile on front of two and often on three also; frequents mountains <i>lancifer lancifer</i> Osten Sacken	
	Pale pile of dorsum nearly white, on posterior callosities may be occasional black hairs; line of dark hairs from base of wing onto occiput thin and inconspicuous; tufts on sides of terga prominent on anterior angles of third segment only, on fourth visible from venter only <i>lancifer kanabensis</i> n. ssp.	
9(6).	Relatively large species (9-12 mm); lower frontal patch almost obsolete, the sparse scales mostly pale brown; patches of dense white or nearly white tomentum on second and following segments form a prominent median line on abdominal dorsum; tomentum of remainder of dorsum hairlike and relatively sparse; frequents foothills <i>nigriventris</i> n. sp.	
	Smaller species (7-10 mm); lower frontal patch prominent, of black hairlike scales; abdomen with crossbands of more or less dense pale scales on posterior half of second and following segments, median line of scales evident but not prominent	10
10(9).	Pale hairs on dorsum mostly dark grayish yellow, many black hairs on mesonotal disc and posterior callosities; some of pale tomentum of abdominal dorsum noticeably pale brown; dorsum appears	

- banded black and pale due to sparse dark tomentum in bands of black pile on anterior part of terga *lancifer lancifer* Osten Sacken
- Pale hairs of dorsum nearly white, few if any black hairs on mesonotal disc and posterior callosities; tomentum of posterior half of second and following abdominal segments whitish gray, that of anterior half of second and third segments tinged with tan, covering segments *lancifer kanabensis*, n. sp.
- 11(4). Lower frontal patch white to grayish 12
- Lower frontal patch yellow to golden 14
- 12(11). Facial pile wholly white; base of wings brownish; pre- and postalar and scutellar bristles prominent, brown; female with many heavy bristles on upper mesopleura *montanus* n. sp.
- At least some black hairs below antennae and along facial orbits; base of wings blackish 13
- 13(12). Most of pile of face black, only that on oral margin yellowish; entire frontal triangle of male covered with dense appressed white scales; on the female these scales are found only between antennae and eyes; dark of wings fills anteroproximal one-third or more of wing; dark spots present on r-m crossvein and free part of vein Cu₁ *metopium* Osten Sacken
- Most of pile yellow to white, only a narrow band of hairs below antennae and on facial orbits black; middle of frontal triangle of male devoid of dense appressed tomentum; only anteroproximal fifth or less of wing dark, no brown clouds on veins or crossveins; prominent crossbands of black pile on abdominal dorsum *abdominalis* n. sp.
- 14(11). At most bases of femora dark, rest of legs reddish tan 15
- Legs black 16
- 15(14). Pile at base of wings golden; dark anterobasal part of wing with distinctly reddish brown cast; male genitalia red, slightly darker than femora; late summer species (August) *aestivus* n. sp.
- Pile at base of wings grayish yellow to white, male genitalia brown to black 17
- 16(14). Abundant erect pile of front, first two antennal segments and wide band below lower frontal patch black and very long in both sexes, female with mixed pale and black on front; pale gray species, female with nearly completely hyaline wings *lassenensis* new name
- No erect pile on front in male; pile of face, appressed hairlike tomentum on front of both sexes, and erect pile of female all same pale color; black pile on antennae and narrow band below lower frontal patch *aurifer pendens* Cole
- 17(15). Halteres yellow; third antennal segment of female widest at or beyond middle, with sides nearly parallel for three-fourths of its length, then tapering abruptly to end; pile of front and ocellar tubercle of female wholly yellow; dark color in wing of male does not extend beyond tip of vein R₁ *aurifer aurifer* Osten Sacken
- Halteres various shades of brown; third antennal segment of female widest before the middle, not evenly tapering toward end; pile of front and ocellar tubercle of female mixed black and yellow; shining white scales form complete band above antennae between eyes; dark color in wing of male more or less fills all of cell R₁ *auriferoides* n. sp.

Bombylius heximaculatus, n. sp.

Wings with five or six distinct black spots in the hyaline area or bordering the dark color. Legs mostly red. 9-12 mm in length.

FEMALE.— Black. Head gray pollinose, occiput densely so; lower frontal patch black, very sparse; tomentum of front sparse, golden; pile of antennae, ocellar tubercle, front, and face black, a few pale hairs around the oral opening; pile of occiput white or nearly so, a patch of brown to black near lower hind angle of eye; segments 1 and 2 of antennae about same width, 2 one-third as long as 1; segment 3 somewhat wider, about one-fourth longer than first two combined, widest at about first third, sides of apical third about parallel; proboscis about five-sixths as long as head and body combined.

Mesonotal disc velvety black; pile long, dense on anterior one-third and sides; sparse, gray mixed with a little black on center and scutellum; with some sparse decumbent grayish yellow tomentum; pleura densely gray pollinose, lavender glints in some lights; a dense patch of mixed black, brown, and gray pile on upper mesopleura, just before wings, continuous with dark hairs of lower occiput; most of rest of pleura naked or nearly so, the sparse pile mostly pale, a few black hairs intermixed.

Wings with anteroproximal one-third smoky, remainder gray hyaline; dark spots on veins at r-m crossvein, base of R_1 , at junction of $M_1 + R_5$, at free part of M_2 , at cubital end of median crossvein, and at free part of Cu_1 . Basicostal pile black, a few pale hairs on sides of costa. Halteres brown.

Legs dark red, hind femora yellowish except knees, others brownish red, darker basally, and tarsi dark; pile of fore coxae pale yellowish gray, of middle coxae mixed black and pale, and on hind ones only a few black in the gray; of rest of legs black; bristles black; tomentum pale, like the pile.

Abdomen faintly gray pollinose; pile dense on sides, lateral fringe mostly almost white on sides of first, anterior half of second, fifth, and following segments, considerable black pile mixed in on sides of posterior half of second and on third and fourth; pile of dorsum most-

ly short pale yellowish gray, with many long black hairs on hind margins of second and following segments. Most of pale pile of venter black, a few pale hairs on first segment; sparse tomentum pale yellow.

TYPE.— Female holotype: Alpine, Utah Co., Utah, 20 May 1955 (L. M. Johnson). Paratypes: 4 ♀ same data.

Several males were collected but became damaged so no description will be attempted at this time. The males are paler, with less black and pale pile on abdominal dorsum and more black pile on sides. Pile of venter is yellowish gray. Females are more tomentose. There is some variation in both sexes in the amount of dark pile at hind angles of eye and on mesopleura between the wing and head.

Bombylius nigriventris, n. sp.

Black. Anteroproximal third of wings blackish, gradually evanescent behind. Most of pile pale yellowish gray, that of abdominal venter mostly black. Length 6-12 mm exclusive of proboscis. Proboscis long, three-fourths as long as to fully as long as body and head.

MALE.— Head black, face except upper and outer margin brown. Front and dark margin of face faintly grayish pollinose. Occiput and genae yellowish gray pollinose. Pile of face, front, antennae, a row along upper orbits on occiput and ocellar tubercle black. That of rest of head pale, faintly yellowish gray, a patch of brown hair on lower occiput. Lower frontal patch of short, black hairlike scales. Antennae cylindrical, segment 1 a little more than twice as long as broad, segment 2 same width, about as long as broad, segment 3 somewhat narrower, slightly more than twice as long as first two combined, widest at its proximal one-fourth, sides of distal two-thirds almost parallel; first segment long pilose, segment 2 very short fine pilose, segment 3 with a few short fine hairs on its upper side on distal half. Palpi black, black haired.

Pile long and dense on anterior third, relatively short and sparse on remainder of mesonotum, very pale yellowish gray, some dark hairs scattered among pale in center of mesonotal disc. Pile of pleura dense above, more sparse below, lower

pteropleura bare, mostly nearly white, that on sterno- and hypopleura slightly yellowish. A band of mixed brown and pale hairs extending from the base of wing forward to join with patch of brown hairs on lower occiput. Pile of scutellum same color, occasional darker hairs along hind margin.

Dark of wings fills alula, basal third of axillary, two-thirds of anal cell, base of fourth posterior to base of discal post-m crossvein to tip of subcostal cell. Remainder of wing gray hyaline, veins dark brown. Basicostal pile mostly black, longer and pale at base, a few pale hairlike scales beneath. Halteres brown.

Coxae and base of femora dark brown, remainder of legs reddish brown; bristles black; pile of coxae pale, many dark hairs intermixed on middle pair, that on femora mixed pale and dark brown; tomentum of legs pale yellowish gray, a line of brown scales on facies of femora.

Abdomen blue black; pile of dorsum long, dense, pale faintly yellowish gray, lateral fringe on second and third and a few hairs on hind margins of second and following segments black, somewhat more numerous on fifth and sixth terga. Pile of first two sternites pale, of rest of venter and on genitalia black, a very few pale yellowish hairlike scales intermixed.

FEMALE.— Less pilose and more tomentose than male. Vertex, front, and dark upper and outer margin of face brown pollinose. Antennal segment 1 about two and one-half times as long as wide; segment 2 same width, as long as wide; segment 3 widest at proximal third, thence tapering evenly to short onion-shaped style. Tomentum of front yellow, a few brownish scales near orbit in lower frontal patch; that of occiput nearly white. Pile of head as in male, except that there are a few pale hairs on front along orbits.

Mesonotum and scutellum with moderately dense, pale grayish yellow curly appressed hairlike tomentum. The band of darker pile extending from base of wing to occiput is yellowish brown, intermixed with a few black hairs. Wings paler than in male, basicosta has more pale tomentum.

Pile of abdomen much coarser than in male, pale hairs mostly more yellow; many more black hairs, that of fifth and sixth terga mostly black; black hairs of

lateral fringe of second and third terga confined to hind angles; lateral fringe of fourth and fifth segments white.

Dense median patches of faintly yellow to white tomentum on second and following terga form a prominent line down middle of abdominal dorsum. Pale hairlike tomentum on hind margins of first two and in median spots on following sternites; rest of sparse tomentum of venter black.

TYPES.— Male holotype: Alpine, Utah Co., Utah 23-V-1955 (D. E. Johnson), female allotype, topotypical, 20-V-1955 (D. E. Johnson), paratypes 13♂♀, topotypical, 11-V-1954, 16-V-1954, 18-V-1954, 22-V-1955, 19-VI-1955, (D. E. and L. M. Johnson); 2♂ 1♀ Dry Canyon, Salt Lake Co., Utah; 1♂ 1♀ Fort Douglas, Salt Lake Co., Utah, 10-V-1933, 6-V-1940 (W. Anderson); 2♂ Oak Creek Canyon, Millard Co., Utah, 24-V-1957 (D. E. Johnson); 1♂ Mt. Carmel Junction, Kane Co., Utah, 21-V-1957 (D. E. Johnson).

In addition to the variation in size, there is some variation in the amount of black pile on the mesonotal disc and hind margins of the abdominal terga in the males, and in the amount and color of tomentum on the abdominal dorsum of the females. In both sexes there is some variation in the amount and color of the dark pile which forms the conspicuous dark line from the base of the wings forward onto the lower occiput.

This species has the same type of face and wings as *lancifer*, but can readily be separated from that species by its larger size, by the absence in both sexes of the crossbands of black pile found on the hind margins of the second and third terga of *lancifer*, by the presence of mostly dark vestiture on the abdominal venter, where *lancifer* is mostly pale, and by the presence in the female of the prominent median line of white tomentum on the abdominal dorsum. Moreover, *lancifer* is a species of the mountains, while *nigri-ventris* appears to be confined to the foothills and valley edges, and is on the wing about a month earlier in the season.

While hovering, the females of this species produce a sound somewhat lower in pitch than the hum of a honeybee, and of a different quality, being more of a buzz than a hum. The hovering males produce a hum considerably higher than

that of the bee. This high-pitched hum was audible to us for a distance of forty or fifty feet, and was frequently used as a means of locating specimens. Frequently males were found hovering or darting about some 7 to 12 or so feet above a given small area. We found our first female, as well as several subsequent ones, resting on the ground beneath such a hovering male. We did, indeed, use the males as guides to the females, collecting first the female and then the male. Another species of *Bombylius heximaculatus* n. sp., was present in the same habitat as *nigriventris*, and was found in far greater numbers. There was sufficient difference in the sounds produced by the two species to readily recognize and locate *nigriventris* specimens by the lower pitch.

The types were taken about one mile west of the village of Alpine, at an elevation of 5,340 feet. The site is a narrow unplowed strip alongside a road through agricultural lands. The whole area is foothills of the Wasatch Mountains above the highest level of Pleistocene Lake Bonneville. With the exception of Mt. Carmel Junction, the other collection sites are also foothill areas of the Wasatch, at elevations between 5,300 and 6,000 feet. The elevation at Mt. Carmel Junction is listed as 5,241 feet.

Although other species were available, the only flowers at which we saw these beeflies feeding were those of *Phlox longifolia*. Wherever we have found *nigriventris* flying we have also found *Phlox* blooming.

Bombylius lancifer kanabensis, n. ssp.

Like *lancifer* O.S. except it has far fewer black hairs on thorax and abdomen. Pale pile of dorsum glistens in reflected light, making the fly appear to shine. Length 8-10 mm.

MALE.— Head black, face shining brown, face and front from some angles lightly brownish gray pollinose, occiput and chin gray pollinose; pile of ocellar tubercle, front, face, antennae, and a few hairs and scales in a patch on occiput near lower corner of eye brown, with a few black intermixed; lower frontal patch black, sparse hairlike tomentum of front pale grayish yellow; pile of chin white, of occiput grayish yellow (same color as

that of adjoining thorax). Antennae slender; segment 1 about three times as long as wide; segment 2 same width as first, about as long as wide; segment 3 not quite as wide as first two, its sides nearly parallel, not quite twice as long as first two combined, its style evenly long conical. Proboscis black, about four-fifths as long as head and body combined.

Thorax black, bluish reflections in some lights, pleura thinly gray pollinose over shining surface; pile fairly long and dense, very pale yellowish gray, nearly white on pleura, a patch of dark brown with a few black hairs before the wing extending onto occiput; macrochaetae not strongly developed, nearly same color as pile. Two black hairs on left posterior callus, none on others.

Wings brownish hyaline, anteroproximal third brownish, color evanescent behind; veins brown; basicostal pile black, a few white hairs near base shading to brown along heavy vein; pile of alulae long, very pale yellowish. Halteres brown. Legs yellow, knees, tarsi, and bases of femora brown, first two pairs broadly so; pile of coxae nearly white, of remainder of legs mostly dark brown to black; tomentum nearly white; bristles black.

Abdomen blue black; pile of dorsum long and dense, faintly yellowish (paler than thorax), tufts on hind angles of second, on hind angles of third when viewed from below, and a few hairs on hind margins of second and succeeding segments black; tomentum nearly white, a sparse patch in center of second and fairly dense crossbands on posterior third of third to fifth segments, covering last segments. Pile of venter mostly white, a few black hairs on hind margins of last three segments; sparse tomentum whitish. Genitalia dull black, shading to brownish at tips.

FEMALE.— Much like the male. Less pilose, but much more tomentose than male. Front brown pollinose; pile black; tomentum golden; a few of the pale scales mixed into the lower frontal patch, especially on inner end. Face with a few scattered yellow hairlike scales scattered among pile. Sparse tomentum of occiput pale yellowish, a few black hairs mixed with pale buff pile near vertex, and a few black and dark buff hairs near lower inner corner of eye. Only a few black

hairs in dark band before the wing. Posterior two-thirds of mesonotum and scutellum with sparse pale yellow curly tomentum. Wings only slightly paler than in male. Dark part of femora less extensive than in male.

Bristly black hairs in tufts on hind angles of second and third terga similar to male, relatively more bristly black hairs on hind margins of second and succeeding terga. Second sparsely except in middle, and succeeding terga densely tomentose on posterior half of segments and in centers, forming a distinct nearly white median line; anterior half of segment 1 almost bare of tomentum, front of 3 and 4 with sparse tomentum. Most of pile on first three ventral segments white, on succeeding segments mostly black; tomentum pale yellow to white.

TYPES.— Male holotype and female allotype: Six miles north of Kanab, Kane Co., Utah, 5-VI-1965 (D. E. & L. M. Johnson). Paratypes: 21 ♂, 12 ♀ same data.

The type locality, six road miles north of Kanab, on U.S. Highway 89, is in the red sandstone hills of the Vermillion Cliffs area. The flies were on a red sandy sidehill among scattered *Juniperus osteocarpa* and *Artemesia tridentata*. Associated with this species were males of *Lordotus apicula* Coq. The males were hovering and the females feeding between 8:30 and 10:00 a.m.

This series of flies is quite uniform. There is, however, some variation in the amount of black pile on the thorax and abdomen. But even the darkest specimens have very few black hairs. This subspecies is readily distinguishable from the nominal subspecies by this scarcity of black pile, and by the paler color of the pale pile, which in this subspecies is nearly white. On females there may be a few brown to black hairs on occipital orbits near the vertex; tomentum of front may be pale yellow, on the occiput and the thorax in front of the wing there may be no dark pile; there may be no brown on the femora.

Bombylius major Linnaeus

This is the earliest bee fly on the wing in the spring in our area. It appears as early as mid-March on the edges of the

valley floors and in the foothills. We have not done any early collecting in the southern part of the state and have not seen this species in the collections of others from there. We have seen it in collections from Arizona.

Bombylius metopium Osten Sacken

This small species appears shortly after *major* around the edges of the valleys of the northern part of the state. As the season progresses, *metopium*, like several others of its congeners, moves up into the canyons and onto the foothills. We have found it common in only a few places, but it is so inconspicuous that we may easily have overlooked it at other sites where we were not specifically seeking it. The shining white tomentum on the male completely obscures the front; on the female it is found only at the sides of the antennae. The specimens have a gray appearance.

Bombylius lancifer lancifer Osten Sacken

We have collected this species in the mountains above 7,000 feet elevation from May into July. We have found them in the canyons and on northern slopes of practically every mountain range in which we have sought them in the northern part of Utah. We do not know how far south they may be found. Specimens have been examined from Utah, Oregon, and California.

Bombylius montanus, n. sp.

Facial pile and lower frontal patch wholly white; macrochaetae well developed. Length 9-11 mm.

MALE.— Head dark brown, densely gray pollinose, face and oral margin yellowish; pile white, a line of dark brown to black hairs on each side of bare pollinose area on frontal triangle between antennae and vertex, some on ocellar tubercle, and upper and outer side of first antennal segment; tomentum of occiput and lower frontal patch at sides above antennae subshining white, a few brown decumbent hairlike scales at junction of inner orbits on upper front. Antennal segment 1 about twice as long as wide; segment 2 about as wide as first, as long as wide; segment 3 about as wide as first

two, about twice as long as first two combined, widest at about the middle, tapering evenly thence to blunt tip; style evenly conical. Proboscis brown, about two-thirds as long as body and head; palpi brown, pile yellow.

Thorax brown, dorsum faintly brownish, pleura densely gray pollinose; pile very dense, pale gray and reddish brown on anterior one-third of mesonotum, sparse on posterior two-thirds except along sides; posterior callosities have dense tufts of pile, reddish at base, gray at ends, bordered next to mesonotum with shorter almost black pile. Sparse pile of mesonotum has pale gray pile with hairlike gray tomentum beneath it in two indistinct longitudinal stripes, with a few black hairs intermixed in the darker contrasting brownish pile on the rest of the disc. Pile and tomentum of scutellum like that of posterior mesonotum; most of macrochaetae brown to black, well developed, three or four on notopleura, a number on posterior callosities and along hind margin of scutellum. Pleura with pile moderately dense, yellowish gray on upper half, less dense and white on lower half.

Anteroproximal half of wing brown, somewhat darker along veins, the color evanescent behind, becoming gray hyaline; veins brown, basicostal pile black, a few white hairs at extreme base of wings; pile of alulae dense, long, white. Halteres brown. Legs yellow, knees and tarsi brown; pile and tomentum pale yellowish to white, bristles black.

Abdomen grayish brown, pollinosity almost same color; pile of first three terga pale brownish yellow on sides, nearly white in middle; dark brown to black bristly hairs form single rows on hind margins on outer third of first and across second and third segments and form prominent tufts on sides of second segment, with small tufts on sides of third; pile of rest of abdominal dorsum white, a few black hairs on hind margin of sixth segment; tomentum white, sparse on second and third, moderately dense on succeeding segments, more concentrated on posterior half and middle of second, third, and fourth; pile of venter mostly white, a few black hairs on terminal three segments; sparse tomentum pale yellow.

Genitalia dark brown and reddish, posterior angles of ninth sternite produced

into sharply pointed spinelike projections; pile yellow.

FEMALE.— Much like male but less pilose and much more tomentose. Wings almost completely hyaline. Pile of occiput yellowish, that of front sparse, mixed black and white. Front and face densely pale gray pollinose. Dark pile of thorax paler than in male. Halteres paler than in male. Tomentum on abdomen nearly white, appearing pale brownish on middles of second, third, and fourth terga because less dense, rest of tomentum dense; pile mostly white, that on hind margins of segments two to four black and bristly, brown to pale on fifth and following segments, brown tufts on sides of two and three. Pile of first three sterna mostly white, rest mostly black and brown, bristly on hind margins of segments.

TYPES.— Male holotype: Aspen Grove, Utah Co., Utah, 19-VII-1953 (D. E. Johnson). Female allotype: Pebble Basin, Bannock Co., Idaho, 24-VII-1948 (D. E. Johnson). Paratypes: 1♂ same data as holotype; 1♂ Strawberry Valley, Wasatch Co., Utah, 10-VII-1969 (on flax and cinquefoil).

In general appearance this species resembles *eboreus* Painter except that the dark of the wings is distinctly brown rather than blackish. However, the strong development of the macrochaetae sets this species apart from all of its congeners in our area. We have seen specimens from Pasadena, California, which may be this species, but more material will be necessary to be certain. Apparent variation shows pile of posterior callosities all pale gray. Slight rubbing destroys distinctive lines on mesonotum. Macrochaetae may be pale.

The holotype and paratype specimens were collected on the Mt. Timpanogos trail about a half mile from Aspen Grove. There were three males and one female alternately hovering and darting about the site, but only two of the males could be captured.

Bombylius abdominalis, n. sp.

Black, pale pile of dorsum mostly yellowish gray. Length 9-12 mm exclusive of proboscis.

MALE.— Head black, densely gray pollinose, oral margin yellow shading to

black below antennae. Appressed shining white tomentum above antennae leaves center pollinose strip bare except for a very few long white scales. Black erect pile on bare area next to white tomentum. Several rows of black pile below antennae and on facial orbits, dense yellowish white pile on lower face and oral margin. Tuft of black pile on ocellar tubercle, tomentum of occiput white, pile yellowish gray above, white when light reflects off it. Antennae with first two segments quite straight-sided, slightly wider than third; first more than twice as long as second, third about one and one-half times the length of first two combined. Black pile on first two segments. Proboscis about three-fourths the length of body and head combined, black, as are palpi. The latter about one and one-half times as long as the width of the base of the proboscis, pile black.

Thorax and abdomen black with pale pile from third tergite forward yellowish gray, shining almost white in some lights, that of fourth and following tergites white. Dorsum of thorax with pile dense at sides and front third of mesonotum and on scutellum; shorter on rear two-thirds, sparse, with a few black hairs intermixed, and with scattered decumbent fine golden tomentum. Macrochetae yellowish. Sparse black pile on scutellum and post allar callosities.

Wings hyaline except anterobasal fourth cloudy reddish brown, evanescent behind. Basicostal pile white, with black on front edge. Pile of alulae white, dense and long. Halteres brownish with part of knobs paler.

Legs have black femora, tarsi dark yellowish brown. Vestiture white, except spines are black.

Dorsum of abdomen with pale pile bushy, black pile in prominent band on rear of second tergite, narrower band on third and some black pile on rear of other segments. All pile slightly shorter on sides of second and third tergites. All tomentum of abdomen is white; scant on second and third tergites, more dense in center of each segment, giving the effect of a stripe, wider in the white pile, very narrow in the black pile. Fourth and following segments with dense tomentum. Venter of second and third segments with long white pile and dense long hairlike

tomentum, following segments with black and white pile scant, and with short white tomentum also not dense, but forming a stripe at center of last three segments. Genitalia very dark, yet not black in color.

FEMALE.— Much like the male. Tufts of black pile on sides of wide upper front and a few fine golden scales on front. Mesonotum with disc back of long pile covered with decumbent fine golden tomentum, more dense on scutellum, where it is arranged with the ends pointing toward center. Abdominal dorsum much more white tomentose, longitudinal stripe more than twice as wide as on male and more continuous, with diamond-shaped effect on second and third segments. Much less white pile than male on dorsum, sides about same. Venter less pilose, heavily tomentose on second and third sternites, following ones with short tomentum forming a stripe on fourth to sixth, covering seventh. Type with front femora dark, other femora partly so, and tarsi paler than male.

TYPES.— Male holotype and female allotype: Stansbury Mountain, Tooele Co., Utah, 23-V-1969 (D. E. Johnson). Paratypes: 23♂, 3♀, topotypical, 23-V-1967, 18-V-1969, 23-V-1969; 8♂, Hickman Canyon, Stansbury Mountain, Tooele Co., Utah, 2-VI-1957; 6♂, 11♀ Clover Creek, Tooele Co., Utah, 9-VI-1957; 16♂, Alpine, Utah Co., Utah, 18-V-1954, 24-V-1969 (D. E. and L. M. Johnson); 1♂ Little Mt., Salt Lake Co., Utah, 17-VI-1968. Other specimens have been collected from Lark, Salt Lake Co., Utah, 9-VI-1953.

In addition to variations in size, there may be little black pile on the thorax; knobs of halteres are sometimes mostly dark; three segment stripe of white tomentum on posterior sternites of male faint or not present; some females have completely pale yellowish brown femora.

The description of this species was incomplete at the time of Mr. Johnson's death. He did not record any information about the ecology of the Stansbury Mountains, Hickman Canyon, or Clover Creek areas, which are all within a 10-mile distance on the east side of the Onaqui Mountains. However, the Alpine specimens were collected in the same strip between cultivated fields as *nigriventris* in the foothills of the Wasatch Mountains,

and all the other areas are wild habitat at similar altitudes and with similar vegetation.

Bombylius aestivus, n. sp.

Similar to *aurifer* O.S. but has all red femora, and pile of face, front, and pleura pale tawny instead of nearly white. Length 5-7½ mm.

MALE.— Dark brown; yellowish gray pollinose on front, face, first and second antennal segments, mesonotum, pleura, first tergum, and venter of abdomen. Antennae black, segment 1 about twice as long as wide; segment 2 about same width, almost round; segment 3 almost twice as long as other two together, not quite as wide, almost parallel sided. Proboscis black, about two and one-half times as long as head; palpi yellow at base, black about half of length, somewhat longer than width of proboscis.

Pile long and shaggy, moderately dense on face, occiput, thorax, and sides of abdomen; color of pile shining pale tawny, somewhat paler on pleura and abdominal venter, with black pile found in a row below lower frontal patch, a few on antennal segments 1 and 2, and sparse tufts of hairs on anterior lateral angles of third and fourth terga. Tomentum hairlike, shining, of about the same color as pile, moderately dense on thorax and abdomen, a dense appressed patch above each antenna. Genitalia pale red.

Legs red, knees narrowly black, tarsi darkening distally; pile and tomentum as on remainder of body, bristles black.

Wings gray hyaline, brown on anterior proximal one-third, color evanescent behind and distally; pile on base of wings and alulae pale tawny, long and shaggy. Halteres brown, knobs pale.

FEMALE.— Very much like the male. Fewer black hairs on face and on anterior angles of abdominal segments than in male. Abdomen relatively broader, more densely tomentose; front with pile and tomentum as in remainder of body.

TYPES.— Holotype male: Provo Canyon, Wasatch Co., Utah, 14-VIII-1966 (D. E. Johnson). Allotype female: Tryol Lake, Uintah Mts., Summit Co., Utah (no other information, but collected before

1931). Paratypes: 4♂, 1♀ topotypical with holotype.

Some damaged specimens in the collection show some variation in the amount of black pile on the face, on antennal segment 2 and on the abdomen. Some specimens, particularly females, have only a very few black hairs, or even none at all in these places.

This species may be readily separated from *aurifer aurifer* O.S. which may occur in the same area by the red femora and by the darker color of the pile of the face, occiput, and pleura, which in *aurifer aurifer* are nearly white. Cole's *aurifer pendens* has only partially red femora.

Whereas the other species of *Bombylius* in this area are flies of the spring and very early summer, this species is apparently not on the wing until much later in the season and is not in evidence until long after the others have disappeared from even the high country that seems to be home for *aestivus*.

The type locality is in the Wasatch Mountains about one mile southeast of the Deer Creek Reservoir in Provo Canyon. The flies were collected on a north-facing slope in open areas between patches of scrub oak, *Quercus gambeli*, and choke cherries, *Prunus melanocarpa*. They were feeding on *Helianthus* sp. and *Aster* sp. The elevation is between 7,000 and 8,000 feet above sea level. The allotype has only a locality label, but Tryol Lake is a similar ecological habitat in the Uintah Mts. Other species of bee flies common in the area at the same time include *Poecilanthrax signatipennis* (Cole), *P. sackenii* (Coq.), *P. willistoni* (Coq.), *Sparnopolius coloradensis* Grote, *Villa edititoides* Painter, *Aphoebantus mormon* Melander, and *Lordotus gibbus* Loew.

Bombylius lassenensis, new name

At the time *Bombylius pallescens* Johnson and Maughan (1935) was described, we were unaware that Hesse (1938:226) had used the name for an African species. Since our species is a junior homonym of *Bombylius pallescens* Hesse, the new name *Bombylius lassenensis* is proposed as a replacement. This species, collected in Lassen Co., California, is included in the key in this paper, even though it is not from Utah.

Bombylius auriferoides, n. sp.

Black, pile mostly pale yellowish gray; similar to *aurifer* O. S. but with brown halteres. 4.5-10 mm in length exclusive of proboscis.

MALE.— Head black, gray pollinose; pale pile faintly yellowish gray, that of ocellar tubercle, antennae, and outer face mostly black; lower frontal patch covered by dense, appressed, shining, nearly white scales which nearly completely obscure the front. Antennal segment 1 about twice as long as wide; segment 2 same width as first, about as long; segment 3 about one and one-half times as long as first two combined, about as wide at its widest part as first two, widest at its basal third; pile of segment 2 mostly pale, that of segment 1 black. Proboscis about half as long as head and body combined.

Thorax faintly grayish pollinose on the mesonotal disc, densely so on pleura; pile long and dense, that on pleura nearly white; short, moderately sparse shining hairlike scales on mesonotum and scutellum. Wings brown on anteroproximal half, gray hyaline behind, color extends to distal end of cell R_1 , evanescent behind; veins brown, darker distally; pile of squamae and extreme base of wing pale, rest of pile of costa black. Halteres brown. Legs black, dense tomentum and most of pile pale, a few dark hairs beneath on first and second femora; bristles black.

Abdomen moderately densely pilose, three tufts of black hairs at anterior angles of third, fourth, and fifth terga; tomentum of abdomen of short, curly, appressed hairlike scales, same color as pile. Genitalia brown, members yellowish distally.

FEMALE.— Much like male, somewhat less pilose and more tomentose. Upper half of front and vertex brownish pollinose, very sparsely tomentose; lower half of front gray pollinose and densely pale yellow tomentose in an uninterrupted band between eyes; pile of ocellar tubercle, front, and antennae with black and pale yellow pile, pale pile being mostly on posterior part of tubercle, along orbits, and on upper part of antennae. Wings somewhat paler than in male. Fewer black hairs at sides of abdomen.

TYPES.— Male holotype and female

allotype: Mt. Timpanogos, Utah Co., Utah, elevation 8,600 ft., 30-VI-1957 (D. E. Johnson). Paratypes: Idaho: Bannock Co., 1♂ Lava Hot Springs, 23-VI-1935. Utah: 18♂, same data as types; Utah Co., Utah: 37♂, 18♀ American Fork Canyon; 1♂, 1♀ Provo; 2♂ Aspen Grove; 8♂, 2♀ Payson Canyon. Salt Lake Co., Utah: 1♂ Lambs Canyon; 4♂, 2♀ Parley's Canyon; 28♂, 7♀ Little Mountain. All specimens collected by D. E. Johnson.

In addition to the remarkable range in size, there is considerable variation in some other characters. The color of the halteres varies from rather pale to very dark brown, with the females usually being somewhat paler than males. The color of pile varies from nearly white to distinctly yellowish, particularly on the dorsum of some specimens. The smaller specimens are usually paler than the larger. The very early season flies are usually paler in all respects than later season specimens. The amount of black pile on the sides of the abdomen varies from three distinct tufts in some specimens to only a few inconspicuous black hairs in others. Some males have no black hairs on either the ocellar tubercle or antennae, while others have a few on either or both. There is variation in the number of black hairs on the antennae, front, and ocellar tubercle of the females; but always there are at least same black hairs at all three of these locations, and always there are some pale hairs along the orbits on the lower front. There is some variation in the relative length of the proboscis. The third antennal segment varies somewhat in shape in drying, but always, in both sexes, there is some constriction between the base of the segment and its widest point, which is nearly always at the basal third. Also, this segment is always narrowest just before the tip, flaring more or less to the end where the onion-shaped style is attached.

This species and *aurifer* O. S. are so similar in general appearance that it was not until we were studying a long series of specimens of what we assumed were *aurifer*, from a single locality to determine the intraspecific variation, that we realized we were dealing with more than one taxon, and that the small differences we had noted consistently separated the

whole into two distinct groups. Inasmuch as the two forms have sympatric distribution they can only be considered as distinct species. The following characters may be used to separate them: In *aurifer* the halteres are always pale yellow; in *auriferoides* they are some shade of brown; the pile of the vertex and front of the females of *aurifer* is always wholly yellow, while in *auriferoides* it is always mixed black and yellow. The sides of the third antennal segment of *aurifer* females are always nearly parallel for the proximal half, and then evenly tapering to the end; this segment in *auriferoides* is always more or less restricted near the base and before the tip, and the widest part is usually before the middle. The dark color in the wing of the males of *aurifer* does not extend beyond the tip of vein R_1 ; in *auriferoides* it more or less fills all of cell R_1 . The females are more

readily separated than the males.

Reexamination of the material listed in the earlier paper by Maughan (1935) shows that all specimens studied are *auriferoides* rather than *aurifer*. The specimens are in too poor condition to include as paratypes. We have found *auriferoides* to be more numerous than *aurifer* in the study area.

LITERATURE CITED

- HESSE, A. J. 1938. A revision of the Bombyliidae (Diptera) of southern Africa. Ann. So. Afr. Mus. 34(1053):332, text figures.
- MAUGHAN, L. 1935. A systematical and morphological study of Utah Bombyliidae with notes on species from intermountain states. J. Kansas Ent. Soc. 8(1-2):27-80, 4 pls.
- MAUGHAN, L., AND D. E. JOHNSON. 1936. Notes on Utah Bombyliidae (Diptera). Proc. Utah Acad. Sci., Arts, Lett. 13:197-201.
- JOHNSON, D. E., AND L. MAUGHAN. 1953. Studies in Great Basin Bombyliidae. Great Basin Nat. 13(1-2):17-27.



1975. "Notes on the genus *Bombylius* Linnaeus in Utah, with key and descriptions of new species (Diptera: Bombyliidae)." *The Great Basin naturalist* 35, 407–418.

View This Item Online: <https://www.biodiversitylibrary.org/item/33051>

Permalink: <https://www.biodiversitylibrary.org/partpdf/36134>

Holding Institution

Harvard University, Museum of Comparative Zoology, Ernst Mayr Library

Sponsored by

Harvard University, Museum of Comparative Zoology, Ernst Mayr Library

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

Rights Holder: Brigham Young University

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.