

T. senescens by the supraorbital stripe being well defined and continued to the nose, its much brighter colour, and white underparts.

Key to the Species.

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|---|-----------------------|
| A. Five black stripes..... | <i>T. asiaticus.</i> |
| B. Three black stripes. | |
| Supraorbital line yellowish, not clearly defined | <i>T. senescens.</i> |
| Supraorbital line white, well marked | <i>T. orientalis.</i> |
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XLVI.—*Contributions from the New Mexico Biological Station.*—VIII. *The New Mexico Bees of the Genus Bombus.* By T. D. A. COCKERELL and WILMATTE PORTER.

Bombus perixanthus, sp. n. (vel *Howardi*, var.).

♂.—Length about 15 millim.

Fairly stout; pubescence black, except at the apex of the abdomen, where it is white, and on the anterior part of the thorax, where it is shining lemon-yellow. With the black, however, is mixed more or less yellow on the face, vertex, and third abdominal segment; while the hair on the scutellum varies from entirely black to a rather dull yellow. The long bristles on the hind tibia are mostly pale ferruginous. The black hair on the abdomen occupies the first four segments, the remaining segments being clothed with dirty white. Wings stained with brown, but not very dark.

Structurally this insect agrees with *B. Howardi*, and it may be that it is a peculiar variety of that species; but even in that case it deserves a name. It is in general appearance very like *B. occidentalis*, but in that species only the first three abdominal segments are black.

Hab. Harvey's Ranch, near Las Vegas, New Mexico, 9600 feet, Aug. 22, 1899 (*W. Porter*). Also between Harvey's Ranch and Beulah, on the same day.

Bombus iridis, sp. n.

♀.—Length 17 millim.

Broad, with black and yellow hair. Hair of face black, with a little yellow intermixed, of cheeks black, of vertex black in front, otherwise yellow. First joint of flagellum nearly as long as 2 and 3 together, 2 scarcely shorter than 3. Thorax with dense lemon-yellow pubescence; a broad black

band between the wings; hair on anterior half of pleura yellow, on posterior half black. Hair of the legs black, the ends of the joints with short pallid pubescence, small joints of tarsi with shining brown pubescence. Wings only moderately dark, the costal margin narrowly suffused with fuscous, especially towards the apex. First three segments of abdomen with black hairs, but *the black is throughout mixed with coppery red*, or on the sides of the first segment wholly or almost wholly pale fulvous or fawn; fourth segment and sides of fifth with yellow hair, quite long, forming a band; apex black. Ventral surface of abdomen with scanty black hair.

Hab. Beulah, New Mexico, May 30, 1899, at flowers of *Iris missouriensis* (W. Porter).

Allied to *B. dubius*, Cresson, but in that species the light hair on the fourth abdominal segment is yellowish white and the basal portion of the abdomen has not the reddish hairs. Another specimen of *B. iridis*, taken at Monument Rock, Santa Fé Cañon, 8000 feet, at *Rudbeckia laciniata*, Aug. 11 (*Ckll.* 4425), has the hair on the sides of the first abdominal segment and somewhat on the second yellow or tawny, while the third segment has a yellowish-fulvous apical band.

Bombus fervidus, Fabr., 1798.

Las Vegas, N. M., July, ♀ (*Ckll.* 3705); Las Vegas, at flowers of *Petalostemon candidus*, Aug. 11, ♂ (W. Porter). White Mts., N. M., Rio Ruidoso, about 6700 feet, at flowers of *Vicia* near *pulchella*, July 29, 1 ♂ (Townsend). Apparently scarce in New Mexico.

Bombus monardæ, sp. n.

Resembles *fervidus*, but the yellow is not so bright, the third submarginal cell is more narrowed above, and the hair of the face and vertex is yellow, with some black on the sides of the vertex and on the front. The pubescence is rather longer and looser than in *fervidus*, *borealis*, or *sonorus*; the hair on the pleura is yellow, not black as in *borealis* and *sonorus*; the wings are only stained with brown, not dark brown as in *sonorus*.

Hab. Monument Rock, Santa Fé Cañon, N. M., 8000 feet, at flowers of *Monarda* (*Ckll.* 4445); Rio Ruidoso, White Mts., N. M., 6500–6600 feet, July 25 to Aug. 1. Six at flowers of *Monarda stricta*, one at *Potentilla Thurberi*, one at *Allium cernuum* (C. H. T. Townsend).

Bombus sonorus, Say, 1837.

Prof. C. H. T. Townsend brought twenty-eight specimens from the Rio Ruidoso, White Mts., N. M., taken from July 20 to Aug. 2, alt. 6500 to 6900 feet, at flowers of *Monarda stricta* (many), *Verbascum thapsus* (many), *Vicia* near *pulchella*, *Prunella vulgaris*, *Mentzelia Rusbyi*, and *Rhus glabra*. Mr. C. M. Barber collected the species in the same locality. One specimen (Ckll. 4672) has been taken at Las Cruces, Aug. 24, at flowers of *Helianthus annuus*.

Handlirsch is certainly in error in regarding this species as a variety of *B. pennsylvanicus*. It is interesting to note that *B. sonorus* appears to be absent from the mountains of northern New Mexico, while, on the other hand, *B. Howardi* seems to be lacking in the White Mts.

Bombus americanorum, Fabr., 1775.

Common in the Mesilla Valley, June, July, October, &c. One at Las Vegas, July 14, at flowers of *Cleome serrulata* (E. K. Rishel).

Bombus Morrisoni, Cresson, 1878.

Common at Santa Fé, Las Vegas, &c., in July and August. At Las Vegas it was taken on the flowers of *Cleome serrulata*, also on *Asclepias*. Romeroville, Aug. 6 (Porter & Ckll.); Aztec (C. E. Mead); Ruidoso Creek, 6900–8200 feet, July 23–Aug. 20, at flowers of *Monarda stricta* and *Solidago trinervata* (Townsend); South Fork, Eagle Creek, Aug. 19, 8300 feet, at *Sicyos parviflorus*; Las Cruces (S. Steel, Ckll.); Mesilla Park, May (J. D. Tinsley); Albuquerque (Ckll.); Dripping Spring, Organ Mts., April 23 (Ckll.); Mescalero Agency, Aug. 22, 1897, at *Salvia lanceolata* (E. O. Wooton).

The vertical range is from 3800 to 8200 feet, but the insect seems to be most abundant at 6500–7500 feet.

Bombus nevadensis, Cresson, 1874.

This species may be divided into two well-marked races, perhaps species, as follows:—

Race *Cressoni*, Ckll.

♀.—Abdomen with only the first three segments yellow, segment 1 often black at base; black thoracic patch usually visible without a lens; pleura with only a small patch of yellow, just below tegulæ.

Length about 23 millim.

Specimens from Washington State and Colorado, sent by Mr. Fox as *nevadensis*. In New Mexico, especially at high altitudes. White Mts., at about 10,300 feet, at flowers of *Delphinium scopulorum*, several (*Townsend*); South Fork, Eagle Creek, Aug. 19, about 8300 feet, at flowers of *Sicyos parviflorus*, two (*Townsend*); North Fork, Ruidoso Creek, Aug. 20, alt. 8200 feet, at flowers of *Solidago trinervata*, two (*Townsend*); Mescalero Agency (*Otis*); Las Vegas, July, two, one at *Cleome serrulata* (*Porter & Ckll.*).

Race *aztecus*, *Ckll.*

♀.—Abdomen with the first four segments yellow, segment 1 yellow at base; black hairs in middle of thorax not visible without a lens; pleura with the anterior half at least yellow.

Usually at lower altitudes than *Cressoni*.

Length about 20 millim.

Aztec, one (*C. E. Mead*); Las Vegas, one (*W. Porter*); Beulah, May 30, at *Verbena bipinnatifida*, one (*W. Porter*); Mescalero Agency, July 12, one (*C. M. Barber*); half a mile below forks of Ruidoso Creek, Aug. 28, one (*Barber*); Rio Ruidoso, July 23–27, 6700–6900 feet, three at flowers of *Monarda stricta*, one at *Lupinus Sitgreavesii*, one at *Verbascum thapsus* (*C. H. T. Townsend*).

Bombus improbus, Cresson, 1878.

Five (♂) from South Fork, Eagle Creek, White Mts., N. M., Aug. 20, about 8200 feet, flying swiftly to and fro (*Townsend*). This is with little doubt the male of *nevadensis*. One specimen was taken by Prof. Townsend on flowers of *Senecio Rusbyi*.

Bombus Howardi, Cresson, 1863.

Beulah, May 30, Aug. 16 (*W. Porter*); Harvey's Ranch, 9600 feet, Aug. 22, 1899 (*W. Porter*); Monument Rock, Santa Fé Cañon, at *Monarda* and *Rudbeckia* (*Ckll.*). Rather common.

Bombus appositus, Cresson, 1878.

Beulah, Aug. 16, at *Polemonium cæruleum* (*W. Porter*); Harvey's Ranch, 9600 feet, Aug. 22 (*Porter & Ckll.*); Monument Rock, Sta. Fé Cañon, at *Monarda* (*Ckll.*); North Fork, Ruidoso Creek, 8200 feet, Aug. 12, at *Delphinium scopulorum* (*Townsend*). The species is rather common at Beulah,

but in the large collection of *Bombus* brought by Prof. Townsend from the White Mts. it is represented by only a single specimen.

Bombus rufocinctus, Cresson, 1863.

Beulah, Aug. 25, ♂ (*W. Porter*); hill near Beulah, Aug. 23, ♂ (*W. Porter*). These are assigned to *rufocinctus*, but some black hairs are mixed with the yellow on the apical portion of the abdomen, though they are not noticed without a lens.

Bombus ternarius, Say, 1838.

Rio Ruidoso, 6700–8200 feet, July 29–Aug. 12, at flowers of *Rudbeckia laciniata*, *Verbascum thapsus*, *Mentzelia Rusbyi*, *Monarda stricta*, *Vicia* near *pulchella*, and *Solidago trinervata* (*Townsend*); Beulah, May 30, at *Iris missouriensis* and wild plum (*W. Porter*); Beulah, Aug. 10–18 (*W. Porter*); Harvey's Ranch, 9600 feet, Aug. 22 (*W. Porter*); Aztec (*C. E. Mead*); Mescalero (*Otis*). This species is not so abundant as *B. juxatus*.

Bombus juxatus, Cresson, 1878.

Beulah, May 30, at *Iris missouriensis* and wild plum (*W. Porter*); Beulah, Aug. 16–23 (*W. Porter*); Harvey's Ranch, 9600 feet, Aug. 22 (*Porter & Ckll.*); South Fork, Eagle Creek, White Mts., 8000–8900 feet, Aug. 18–19, at *Sicyos parviflorus* and *Brittonastrum pallidum* (*Townsend*); Rio Ruidoso, 6500–8300 feet, July and August, at *Verbascum thapsus*, *Prunella vulgaris*, *Vicia* near *pulchella*, *Monarda stricta*, *Mentzelia Rusbyi*, *Solidago trinervata*, and *Verbena stricta* (*Townsend*); South Fork, Eagle Creek, Aug. 18, at *Allium cernuum* (*Townsend*); Ruidoso Creek, Aug., at *Geranium Richardsoni* (*E. O. Wooton*); East of Santa Fé, 7400 feet, at *Senecio* (*Ckll.*); Sta. Fé Cañon, 7600 feet, at *Cnicus* (*Ckll.*); Monument Rock, Sta. Fé Cañon, at *Monarda* and *Rudbeckia* (*Ckll.*). A very abundant species at 8000–9000 feet.

Bombus scutellaris, Cresson, 1863, var.

♂.—Length about 16 millim., of anterior wing 14 millim.

Pubescence of head black, of thorax yellow with a very broad black band between the wings, and the lower part of pleura and sides of metathorax black; pubescence of legs short and black, of abdomen yellow on the first two dorsal segments, black on the rest; tegulæ shining black; wings dark fuliginous; third submarginal cell very broad above,

narrowed much less than half to marginal. Spurs dark ferruginous. Malar space about twice as broad as long. The pleura may be all yellow. Abdomen rather long and narrow.

Hab. Las Vegas, N. M., Aug. 11, 1899, at flowers of *Petalostemon candidus*, two examples (*W. Porter*).

This is apparently a slight variety of *B. scutellaris*, Cresson. *B. affinis*, Cress., from Massachusetts, is also a very similar insect, but differs by having the second abdominal segment mostly pale seal-brown or rufo-fulvous.

Bombus prunellæ, Ckll., sp. n. (vel *Edwardsi*, subsp.).

♀.—Length about 18 millim.; broad, $6\frac{1}{2}$ millim. between wings; breadth of abdomen 9 millim.; length of anterior wing 15 millim.

Pubescence moderately loose and long, black and pale canary-yellow; clypeus shining, very sparsely punctured; lower sides of face, surrounding clypeus, with black hair; middle of face about antennæ with yellow hair; occiput with yellow hair, bordered in front with black; a patch of yellow in the middle of the vertex above the ocelli; cheeks with black hair; thorax with yellow hair above and beneath, except a large transversely oval patch between the wings, where it is black; legs with black hair, more or less light fulvous on the tarsi; abdomen with yellow hair on segments 1 and 2, black on 3 except at extreme sides, yellow on 4 and 5, and black at apex; wings dusky, third submarginal cell narrowed about one half to marginal.

♂.—Length about 12 millim.

Coloured like the female, but the yellow is not so bright and the black is more suffused, and the third and fourth abdominal segments are black. The pubescence of the head is long and almost all black, and there are black hairs all over the mesothorax and scutellum, mixing with the yellow towards the sides. First joint of labial palpus $3250\ \mu$, second $1000\ \mu$.

♀, var.—The black invading the sides of the second abdominal segment. (Beulah.)

♀, var.—The black covering the fourth segment as well as the third. (Rio Ruidoso.)

Hab. Beulah, N. M., 1 ♀, May 30, 2 ♂, Aug. 18 (*W. Porter*); Rio Ruidoso, White Mts., N. M., 6500–8200 feet, July and August, 4 ♀, 60 ♂, at flowers of *Monarda stricta*, *Verbena stricta*, *Solidago trinervata*, *Prunella vulgaris*, *Potentilla Thurberi*, *Rhus glabra*, *Sicyos parviflorus*, *Geranium atropurpureum*, *Vicia* near *pulchella*, *Commelina dianthifolia*, and

Mentzelia Rusbyi (C. H. T. Townsend). Many workers were taken on the *Prunella*. Those from the *Mentzelia* are laden with pollen. This species (♀) was also taken by Mr. C. M. Barber on the Rio Ruidoso, Aug. 28, and by Mr. Otis at the Mescalero Agency.

This is very close to *B. Edwardsii*, Cresson, but differs in the ♀ having the first two abdominal segments yellow. The ♀ var. from Beulah connects the typical *prunellæ* ♀ with *Edwardsii*, and it may be that the insects will be found to intergrade. *B. Putnami*, Cress., seems also allied.

The following table will serve for the separation of the New-Mexico *Bombi*:—

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|--|------------------------------------|
| Abdomen with a distinct reddish-orange or orange-fulvous band | 1. |
| Abdomen without any distinct orange or red band | 3. |
| 1. Abdomen without black, or with only a few black hairs among the yellow; red band on segment 3 or 3 and 4 | <i>rufocinctus</i> , Cress. |
| Apex of abdomen black | 2. |
| 2. Red band very bright, on segments 2 and 3; 4 yellow | <i>ternarius</i> , Say. |
| Red band not so bright, on segments 3 and 4. | <i>juxtus</i> , Cress. |
| 3. Dorsum of thorax yellow, without a band; apex of abdomen black or (<i>improbus</i>) black and ferruginous | 4. |
| Dorsum of thorax yellow in front, black behind | 6. |
| Dorsum of thorax with a black band between the wings; scutellar region yellow. | 7. |
| 4. Dorsum of thorax entirely yellow; lower edge of yellow on abdomen (♀) convex. | <i>Morrisoni</i> , Cress. |
| Dorsum of thorax with some black hairs centrally; hind edge of yellow on abdomen straight | 5. |
| 5. Apex of abdomen all black | <i>nevadensis</i> , Cress. |
| Apex of abdomen ferruginous; subapical part black | <i>improbus</i> , Cress., ♂. |
| 6. Base and apex of abdomen black; segments 2 and 3 and apex of 1 yellow | <i>americanorum</i> , Fabr., ♀. |
| Base of abdomen black, apex white; segment 3 yellow, 4 black | <i>Howardi</i> , Cress., var. |
| Abdomen black, with a yellowish-white apex; no yellow band | <i>perixanthus</i> , Ckll. & Port. |
| 7. Thorax before the band white; abdomen yellow, with no black band | <i>appositus</i> , Cress. |
| Thorax before the band yellow | 8. |
| 8. Abdomen yellow, with a black apex | 9. |
| Abdomen entirely yellow or ochreous | <i>americanorum</i> , Fabr., ♂. |
| Abdomen black, with a whitish apex | <i>perixanthus</i> , Ckll. & Port. |
| Abdomen black, with a white apex and a yellow band | [ter, var. <i>Howardi</i> , Cress. |

- Abdomen yellow, with a broad black band. . . *prunellæ*, Ckll.
 Abdomen black, with a yellow band on segment 4; segment 1 more or less yellow or fulvous; 2 and 3 black, with coppery hairs intermixed *iridis*, Ckll. & Porter.
 9. Abdomen with the two basal segments yellow, the rest black. *scutellaris*, Cress.
 Abdomen with at least three segments yellow. 10.
 10. Yellow very bright; wings very dark; pleura black *sonorus*, Say.
 Yellow not so bright, more ochreous; wings not so dark; pleura mostly or wholly light. 11.
 11. Hair of face and vertex yellow *monardæ*, Ckll. & Porter.
 Hair of face and vertex black *fervidus*, Fabr.

It is intended in a later paper to give an account of the mouth-parts of the several species, after the manner of Radoszkowski.

Mesilla Park, New Mexico, U.S.A.,
 Sept. 30, 1899.

BIBLIOGRAPHICAL NOTICE.

The Geography of Mammals. By W. L. SCLATER, M.A., F.Z.S., and P. L. SCLATER, M.A., Ph.D., F.R.S. London: Kegan Paul, Trench, Trübner, & Co., Ltd. 1899.

THIS book of 328 pp., with 50 text-illustrations, tables, and 8 folding maps, fills a gap in our series of zoological works of reference. It is divided into three parts or sections:—a first (of seven chapters) on the Terrestrial Areas as determined by Mammalian Distribution; a second (of one chapter) on the Marine Regions in relation to the Cetacea and Sirenia; and a third (like the first, of seven chapters) on the Distribution of the several Orders of Mammals. Of these sections, the first is a reprint, with slight alterations, of some articles contributed during 1894–1897 by Sclater Fils to the ‘Geographical Journal,’ the second a reprint of a paper by Sclater Père in the Zoological Society’s ‘Proceedings’ for 1897, the third (for which the latter also is alone responsible) constituting the original portion of the work.

The maps are coloured and most admirable, and it is difficult to over-estimate the value of the illustrations, many of which are new and highly welcome. Following Huxley, the authors recognize as their three leading areas the Arctogæa, Neogæa, and Notogæa, and in their determination of subregions and description of representative faunas they have succeeded in maintaining a uniformity of treatment and general accuracy which is in itself a strong recommendation



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