

THE INSECT VISITORS OF FLOWERS IN NEW MEXICO.—II.

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THE present paper relates mostly to some investigations made in September and October, 1897, during a trip northward up the Rio Grande Valley. The localities visited were Rincon, Albuquerque, Santa Fé, Española, Embudo, and Rinconada.

Rincon, N. M., Sept. 14th.

While the train stopped I was able to do a few moments' collecting, and obtained three species of bees:—

- (1). *Nomia foxii*, Dalla Torre. One female at flowers of *Solanum elaeagnifolium*.
- (2). *Perdita callicerata*, Ckll. At flowers of *Baileya multiradiata*.
- (3). *Halictus* sp., apparently new, at flowers of *Gutierrezia sarothra*.

Albuquerque, N. M., Sept. 15th to 17th.

Altitude 5026 ft. Lat. 35° 05'. Annual precipitation, 7.19 inches. Mean temperature: annual, 55.8°; for September, 68.5°.

The following flowers, which were collected, were not observed to be visited by bees:—*Gaillardia*, prob. *pulehella*, *Aster multiflorus*, *Eriogonum rotundifolium*, *Orocarya* prob. *suffrutescens*, *Abronia fragrans*, *Astragalus* sp., *Salvia lanceolata*, *Carlowrightia linearifolia*, *Anemiopsis californica*, *Chrysothamnus* (i. e. *Bigelovia*) *bigelovii*, *Flaveria angustifolia* (almost over). The *B. bigelovii* was common by the roadsides in the part of the town known as the Highlands, and was badly infested by some gall-making dipteran. I am indebted to Prof. L. O. Wootton for the names of these plants.

The following flowers were visited by bees:—

- (1). *Cleome serrulata*; visited by *Bombus morrisoni*, Cr., *Podalirius urbanus* var. *alamosanus* (Ckll.), and *Perdita zebrata*, Cr.
- (2). *Grindelia* sp.; visited by *Ashmeadiella bucconis* (Say), which is new to the fauna of New Mexico.
- (3). *Bigelovia wrightii*; visited by *Prosopis asinina* var. *bigelovia*, Ckll. ined., *Nomia nevadensis*, Cr., *Epeolus occidentalis*, Cr., and *Colletes armata*, Patt.

- (4). *Helianthus annuus*; visited by *Perdita albipennis* var. *hyalina* (Cr.), *Pseudopanurgus aethiops* (Cr.) *Melissodes agilis*, Cr., *Andrena helianthi*, Rob. (new to N. M.), and *Nomia persimilis*, Ckll. ined., ♀. The females of *Nomia persimilis* mimic *Andrena helianthi* to such a degree that when collecting them I did not distinguish the two species.
- (5). *Asper* sp. with purple rays; visited by males of *Nomia persimilis*, Ckll. ined.

There is one thing to be noticed in connection with the above records, namely, that the flowers which attracted the bees are not only of bright colours, but occur in large masses, so as to be visible from a distance. The other eleven flowers are either comparatively inconspicuous, or do not occur in large masses, except perhaps the *Anemiopsis*, which seems quite unsuited for bees.

Santa Fé, N. M., Oct. 3rd to 5th.

Alt. 7,026 ft. Lat. 35° 41'. Ann. precip. 14.69 in. Mean temp.: annual, 49.6°; for October, 51.0°.

The end of the bee season was at hand, and few species were on the wing. *Bigelovia* or *Chrysothamnus speciosus* var. ? *latisquameus* (det. E. O. Wooton) was still in flower, and attracted *Halictus ligatus*, Say, ♂, *Colletes americana*, Cr., ♀, and females of *Melissodes*, besides some undetermined males of *Halictus*. In a garden, marigolds and marguerites were yet in bloom, and I watched them with interest because, although garden flowers are usually unattractive to wild bees, they are visited when the wild flowers are mostly over, at the end of the summer. The result was as follows:—

- (1). Marigolds; visited by males of *Halictus ligatus*, Say, and males and females of some small species of *Halictus* not yet studied.
- (2). Marguerite; visited by one ♀ *Perdita snowii*, Ckll. This was a most interesting capture, as the species was hitherto known only by a unique specimen taken in Colorado. On Oct. 2nd I took at the marguerite a ♀ *Perdita zebraata*, Cr. (which normally visits *Cleome*), and a ♀ *Halictus*.

A single patch of the wild golden-rod (*Solidago canadensis*), almost over, was visited by a ♀ *Halictus* on Sept. 20th.

Española, N. M., Sept. 25th.

Two males of *Halictus* were taken while the train stopped. There were found here, close to the station, not only the common *Xanthium canadense*, but a quite different species of *Xanthium*, which to my surprise is reported by Prof. Wooton as differing from anything in the herbarium of Columbia University.

Embudo, N. M., Sept. 25th to 27th.

Alt. 5800 ft. Lat. 36° 10'. Ann. precip. 9.74 inches.

This locality was entirely new ground, entomologically speaking.

The following flowers were collected, but were not observed to be visited by bees:—*Nasturtium sinuatum*, *Campanula parryi*, *Melilotus indica*, *M. alba*, *Fallugia paradoxa*, *Amarantus palmeri*, *A. græcizans*, *Bahia absinthifolia*, *Aphyllon multiflorum*, *Euphorbia serpyllifolia*, *Polygonum* (perhaps *pringlei*). These were all determined by Prof. E. O. Wootou. In the Mesilla Valley *Melilotus indica*, when massed in quantity, as was not the case at Embudo, is attractive to small bees (*Halictus*, *Sphæcodes*, *Calliopsis*, *Prosapis*) at the beginning of May. I have taken *Nomia nevadensis* at *Fallugia paradoxa* at Albuquerque at the end of June; it is fairly attractive to hymenoptera when occurring in quantity; when collected at Embudo it was nearly over, only an occasional flower being seen. On Aug. 13th, at Mesilla, I saw *Aphyllon multiflorum*, Gray, persistently visited by a *Ceratina*; a single honey-bee also visited the flowers. The flowers turn indigo blue when subjected to cyanide fumes.

The following flowers at Embudo were visited by bees:—

- (1). *Cleome serrulata*. Almost over; visited by *Prosapis* n. sp., ♀.
- (2). *Bigelovia* (or *Chrysothamnus*) *viscidiflora* (det. E. O. Wootou).
- (3). *Bigelovia* sp.

There were two species of *Bigelovia*, but unfortunately when collecting I did not at first appreciate this fact, and the collections were not separated. From the lower-growing form I took *Perdita rhodura*, Ckll. ined. (abundant), *Andrena vulpicolor*, Ckll. ined. (several), *Podalirius maculifrons* (Cr.), *Agapostemon* ♂, ♂, and a ♂ *Colletes* new to me. On the taller species *Perdita affinis*, Cr. (new to N. M.) was common. The other *Bigelovia* bees at Embudo were *Colletes americana*, Cr., ♀, *C. simulans*, Cr., ♀ (new to N. M.), *Perdita subfasciata*, Ckll. ined. (one), *P. townsendi*, Ckll. (hitherto supposed peculiar to the White Sands), *Calliopsis coloradensis*, Cr. (one), and sundry females of *Melissodes*. The new *Andrena vulpicolor* is a particularly fine species, with the thoracic pubescence of a foxy-red colour.

To complete the list of Embudo bees, it may be mentioned that a female *Agapostemon texanus*, Cr., was taken from a hole in the ground.

Rinconada, N. M., Sept. 26th.

This is only a few miles above Embudo. Two species of flowers were visited by bees:—

- (1). *Verbesina encelioides*; visited by *Halictoides marginatus* (Cr.), *Heriades variolosa* (Cr.), which is new to N. M., *Megachile* sp. ♂, *Megachile* sp. ♀, and *Megachile* sp. ♀.
- (2). *Bigelovia*, a tall species; visited by *Melissodes menuacha*, Cr.,

Colletes americana, Cr., *Colletes* sp. ♂ (new to me), *Agapostemon* sp., ♂, and *Calliopsis* n. sp. near *coloradensis*. Also by the butterfly *Pyrameis cardui* and the syrphid fly *Chrysogaster bellula*, Williston.

It is thus seen that the visitors observed at these two Compositæ were entirely different.

Las Cruces, N. M., Sept., Oct., 1895.

The following collections of autumnal bees have not heretofore been reported:—

- (1). *Verbescina encelioides*; Oct. 9th, visited by a ♀ *Pseudopanurgus athiops* (Cr.).
- (2). *Aster hesperius*, Gray; Oct. 4th, seemed little attractive to bees: visited only by *Agapostemon melliventris* (Cr.), ♂, and a ♂ *Halictus*.
- (3). *Baileya multiradiata*; Oct. 23rd, visited by *Parandrena rhodocera* (Ckll.).
- (4). *Helianthus annuus*; Sept. 21st, visited by *Panurginus perlavis* (Ckll.), *Halictoides marginatus* (Cr.), in great numbers, *Andrena pulchella*, Rob., *Melissodes agilis*, Cr., and *Podalirius maculifrons* (Cr.).

It is curious that the sunflower *Andrena* at Las Cruces should be *A. pulchella*, while that at Albuquerque is *A. helianthi*.

Las Cruces, N. M., Aug. 23rd, 1897.

In the *Larrea* zone close to Las Cruces the following were collected by Prof. C. H. T. Townsend and the writer from flowers of *Cevallia sinuata*, Lag. (Loasacæ):—

Melissodes luteicornis, Ckll., ♂, *Centris casalpiniæ*, Ckll., ♂, *Podalirius californicus*, Cr., ♂, *Anthidium maculifrons*, Sm., ♂, *Bombus near fervidus*, prob. n. sp.

Mesilla, N. M., Aug. 21st, 1897.

The flowers of *Martynia* sp. were observed to be visited by *Podalirius vallorum*, Ckll., ♀. On Aug. 19th, at Mesilla Park, *P. vallorum* ♂ was visiting a cultivated *Calliopsis*. The two species of flowers mentioned, though of quite different affinities, are not dissimilar in colour and form.

Mesilla, N. M.