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

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While much has been written on the relations between insects and flowers, it must be confessed that the information we possess on this fascinating subject is fragmentary indeed in comparison with what might be known; in other words, there is no locality where flowers grow and insects fly in which poor comparison with what might be known; in other words, there are whole regions from which we have practically no records.

Hermann Müller, in his 'Fertilisation of Flowers,' gives what might at first sight seem a very complete array of facts, but we find him strongly insisting on the incompleteness of his researches. In America the subject has only been seriously attacked by one observer, Mr. Charles Robertson, whose observations are confined to Illinois and Florida.

The subject is more complicated than might at first be imagined. Repeated observation only confirms the validity of the following rules:

1. Observations made in one year should be repeated in other years, as the results of different years may greatly differ.
2. Observations made on a plant in one locality should be repeated in other localities throughout the range of the plant, as the insect visitors are often different in different parts of the plant's range.
3. Observations made on plants growing in cultivation, away from their natural habitat, prove little regarding the natural visitors of the plants.
4. Observations on the Honey-bee prove little regarding the actions of wild bees; each species of bee must be observed separately, its habits cannot be certainly inferred from observations on other species.

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(5.) Observations should be made at different dates during the period of blooming of the plant studied; the visitors at one period may be very different from those at another.

(6.) In every case it is important to state the names of the insects observed. This is perhaps the chief stumbling-block to observers. Even H. Müller in Europe had to leave many of his captures unrecorded, because he could not find out their names. In other countries, where much less is known about the insect fauna, and many of the species are undescribed, the difficulty is much increased.

The object of the present series of papers is to put on record a number of new observations made in New Mexico, adding such comments as the facts may suggest. It will be necessary to introduce more botanical matter than usually appears in the pages of 'The Zoologist'; in fact, similar papers have appeared in botanical journals, their botanical aspect being as important as the entomological.

(1.) Euchloe cymbalavaria, Pursh.—A good patch in flower by the Rio Grande, Mesilla, April 10th, 1897. An obvious Tariopsis was pretty common on the flowers, but no other insects, except a single specimen of the small fly, Eugnaris occidentalis, Coquillett.

(2.) Argemone platyceras, L. & O. (Papaveraceae).—At Santa Fe, Aug. 3rd, in the afternoon, found many plants with closed flowers, inside which were numbers of bees, all more or less sleepy, crawling but not flying when disturbed. A beetle, determined by Capt. Casey as Cardapithecus pallipes, was also common in the flowers. The bees were as follows:

   a. Podalirius occidentalis (Cresson).—Twenty-eight specimens. I have never taken this on any other flower.
   b. Dianthus ecuadorianus (Cresson).—Thirty. Visits other flowers.
   c. Melissodes menacha, Cresson.—Seven.
   d. M. agilis var. aurigenia (Cresson).—Nine.
   e. Andrena argemonea, Cresson.—Two. This species was described as new (1896) from these specimens, and no others are yet known.

One specimen of an Otioclychid beetle, Peritaris hopidia, Lec., was also taken from the flowers. The consideration of the above case suggests that flowers which are not particularly attractive to bees when open may gain something by affording good sleeping places when closed in dull weather. The bees, when the flowers opened, would fly away, carrying more or less pollen with them, which they might transfer to other flowers. This idea did not occur to me when the observations were made, so I neglected to note the facts which might confirm it.
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(3.) *Euchloeocitina mexicana*, Greene (Papilionacea).—On April 21st, near Dripping Spring, Organ Mountains, the flowers were visited by *Anoplophora neglecta*, Ckll., and *Halictus baudini*, Cresson, var. These are short-tongued bees.

(4.) *Neotoma angustata*, Nattali (Cruciferae).—By the Rio Grande at Mesilla, April 19th, 1897. The following occurred on the flowers:

(a.) Diptera.—Several *Euniceius occidentalis*, Coq.; also a Syrphid.

(b.) Coleoptera.—*Phylloetra purito*, Horn, and a *Dolopa*.

(c.) A black *Chalcid.*

(d.) Bees.—*Andrena silicicolla*, Ckll., one female; *Prenaea meilla*, Ckll., two males; *Halictus subobscurus*, Ckll., one female; and *Halictus sp.*, four females.

(5.) *Streptanthus caricanthus*, Wright, var. (Cruciferae).—At Little Mountain, Mesilla Valley, March 20th, took the following on the flowers:


(c.) *Dichyrus violacei*, Engelm. (Cruciferae).—On April 9th, in the campus of the New Mexico Agricultural College, Mesilla Valley, the flowers were visited by *Prenaea meilla*, Ckll. (male); *Amphipha*, and *Halictus*. At Mesilla, May 29th, the flowers were visited by *Calliopea australis*, Ckll.

(7.) *Pyrus communis* (cultivated pear).—On the farm of the New Mexico Experiment Station, Mesilla Park, April 12th, the following were seen on the flowers:—*Apis mellifica*, several; *P. tigrina cardui*, many; *Dianthus Erythraea*, one, eating the petals. I do not find pear-blossoms at all attractive to native bees in New Mexico; in Europe, on the contrary, Müller observed seven different bees.

(8.) *Prunus* (cultivated plum).—In Mesilla, April 18th, 1897, I found at the flowers three butterflies—*Symelenium laciniata*, *Euceraea triangularis*, and *Aronia archippus*; also a *Tachinid fly, Archytas tennellus*, Macq., and the bees *Anoplophora neglecta*, Ckll. (quite numerous), and *Halictus pectoralis*, Ckll. (a few). The *Tachinid* was identified by Mr. Coquillett.

(9.) *Pyrus malus* (cultivated apple).—In Mesilla, April 18th, 1897, there were plenty of honey-bees at the apple flowers, but practically no wild bees. I caught on a flower a single *Anoplophora neglecta*. An ochnaceous *Tryps* was fairly common on the flowers at one place. One example of *Euniceius occidentalis* was taken. *Amidia archippus* was visiting the flowers of the topmost branches. Müller found nine bees visiting apple flowers in Europe.

(10.) *Digeloria wrightii*, Gray (Compositae).—I have at different times recorded many insects from the flowers of this plant. The following are some additional data:—In September, close to the Agricultural College, Mesilla Valley, were collected the following:—

(a.) Parasitic Hymenoptera, determined by Mr. Ashmead:—*Labos sp.*, male; *Brennitz politus*, Prov.; *Chelonus electus*, Cr., male; *Anatelas sp.; Microplitis sp.; Cremnoza vulgaris*, Cr., female; *Aphites titillator*, Prov., male; *Microcnthus falcatus*, Cr., male; *Monocus sp.; Creontias sp.; Perilampus platyophterus*, Say, female; *Eurytoma bigelovia*, Ashm., male; *Trypsus pygmeus*, Ashm., female; *Catolabus incertus*, Ashm., female; *Empidium cyaniceps*, Ashm., female.

(b.) Diptera determined by Mr. Coquillett:—*Euphorobors elastipennis*, Macq.; *Tachina eryphie*, Towns.; *Sepulca violacea*, Meig.; *Oedopa capito*, Loew. The following Parasitall Hymenoptera, mostly determined by Mr. Fox, are from the flowers of *B. wrightii*. The *Paratiphi* was taken at Albuqueque; all the others in the Mesilla Valley:—


2. *Astatia elegans*, Cr., var.—Sept. 11th.


