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## The Insect Visitors of Flowers in New Mexico— I.

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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 new and interesting observations may not be made, while 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.

(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.) *Ranunculus cymbalaria*, Pursh.—A good patch in flower by the Rio Grande, Mesilla, April 19th, 1897. An ochreous *Thrips* was pretty common on the flowers, but no other insects, except a single specimen of the small fly, *Eugnoriste occidentalis*, Coquillett.

(2.) *Argemone platyceras*, L. & O. (*Papaveraceae*).—At Santa Fé, 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 *Carpophilus pallipennis*, 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.) *Diadasia enavata* (Cresson).—Three. Visits other flowers.
- (c.) *Melissodes menuacha*, Cresson.—Seven.
- (d.) *M. agilis* var. *aurigena* (Cresson).—Nine.
- (e.) *Andrena argemonis*, Ckll.—Two. This species was described as new (1896) from these specimens, and no others are yet known.

One specimen of an Otiiorhynchid beetle, *Peritarsia hispida*, 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.

(3.) *Eschscholtzia mexicana*, Greene (*Papaveraceæ*).—On April 21st, near Dripping Spring, Organ Mountains, the flowers were visited by *Augochlora neglectula*, Ckll., and *Halictus lusorius*, Cresson, var. These are short-tongued bees.

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

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

(b.) Coleoptera.—*Phyllotreta pusilla*, Horn, and a *Collops*.

(c.) A black Chalcidid.

(d.) Bees.—*Andrena salicincta*, Ckll., one female; *Prosanis mesilla*, Ckll., two males; *Halictus subobscurus*, Ckll., one female; and *Halictus* sp., four females.

(5.) *Streptanthus carinatus*, Wright, var. (*Cruciferae*).—At Little Mountain, Mesilla Valley, March 26th, took the following on the flowers:—

(a.) Bees.—*Apis mellifera*, L., 1758 (*mellifica*, L. 1761); *Agapostemon melliventris*, Cresson; *A. texanus*, Cresson; *Halictus bardus*, Cresson; *H. sisymbrii*, Ckll.

(b.) Diptera.—*Calliphora erythrocephala*, Meig. (det. Coq.); *Paradidyma magnicornis*, Towns. = *singularis*, Towns. (det. Coq.).

(6.) *Dithyrea wislizeni*, Engelm. (*Cruciferae*).—On April 9th, on the campus of the N. M. Agricultural College, Mesilla Valley, the flowers were visited by *Prosanis mesilla*, Ckll. (male), *Ammophila*, and *Halictus*. At Mesilla, May 29th, the flowers were visited by *Calliopsis australis*, Ckll.

(7.) *Pyrus communis* (cultivated pear).—On the farm of the N. M. Experiment Station, Mesilla Park, April 12th, the following were seen at the flowers:—*Apis mellifera*, several; *Pyrausta cardui*, many; *Diabrotica 12-punctata*, 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—*Synchlora lacinia*, *Eucanessa antiopa*, and *Anosia archippus*; also a Tachinid fly, *Archytas lateralis*, Macq., and the bees *Augochlora neglectula*, Ckll. (quite numerous), and *Halictus pectoraloides*, 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 *Augochlora neglectula*. An ochreous *Thrips* was fairly common on the flowers at one place. One example of *Eugnoriste occidentalis* was taken. *Anosia archippus* was visiting the flowers of the topmost branches. Müller found nine bees visiting apple flowers in Europe.

(10.) *Bigelovia wrightii*, Gray (*Compositæ*).—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:—*Labeo* sp., male; *Bracon politus*, Prov.; *Chelonus electus*, Cr., male; *Apan- teles* sp.; *Microplitis* sp.; *Cremnops vulgaris*, Cr., female; *Agathis tibiator*, Prov., male; *Microdus fulvescens*, Cr., male; *Mesostenus* sp.; *Cremastus* sp.; *Perilampus platygaster*, Say, female; *Eurytoma bigeloviae*, Ashm., male; *Torymus cyaneogaster*, Ashm., female; *Catolaccus incertus*, Ashm., female; *Eupelmus cyaneiceps*, Ashm., female.

(b.) Diptera determined by Mr. Coquillett:—*Euphorocera claripennis*, Macq.; *Tachina orgyia*, Towns.; *Sepsis violacea*, Meig.; *Oedopa capito*, Loew.

The following Fossorial Hymenoptera, mostly determined by Mr. Fox, are from the flowers of *B. wrightii*. The *Paratiphia* was taken at Albuquerque; all the others in the Mesilla Valley:—

*Scolia* sp. aff. *consors*, Sauss.—Sept. 11th.

*Astutus elegans*, Cr., var.—Sept. 11th.

„ *bellus*, Cr.—Sept. 11th.

„ *bigeloviae*, Ckll. and Fox.—Sept. 11th.

*Myzine hyalina*, Cr.—Sept. 12th.

*Gorytes bigeloviae*, Ckll. and Fox.—Sept. 12th.

„ *eximius*, Prov.—Sept. 11th.

*Nysson solani*, Ckll.—Sept. 11th.

*Aphilanthops laticinctus*, Cr.—Sept. 12th.

„ *taurus*, Ckll.—Sept. 12th.

*Eucerceris canaliculatus*, Say.—Sept. 12th.

*Ammophila pruinosa*, Cr.—Sept. 11th.

*Crabro abdominalis*, Fox.—Sept. 12th.

*Paratiphia albilabris*, Lep.—Aug. 16th.