Utah State University
DigitalCommons@USU

Da | Bee Lab

5-1-1893

The Nest and Parasites of Xylocopa Orpifex

Anstruther Davidson

Follow this and additional works at: https://digitalcommons.usu.edu/bee_lab_da

Part of the Entomology Commons

Recommended Citation

Davidson, Anstruther, "The Nest and Parasites of Xylocopa Orpifex" (1893). *Da.* Paper 136.
https://digitalcommons.usu.edu/bee_lab_da/136

This Article is brought to you for free and open access by the Bee Lab at DigitalCommons@USU. It has been accepted for inclusion in Da by an authorized administrator of DigitalCommons@USU. For more information, please contact digitalcommons@usu.edu.

UtahStateUniversity
MERRILL-CAZIER LIBRARY

Davidson, Anstruther 1893
The Nest and Parasites of Xylocopa Orpifex.

(1893)

Bassett, H. F.--I.
Notes on the Cynipidae--I.

4:151-153

INSECT SURVEY SECTION

Leptotrachelus dorsalis Fab. is not an abundant insect, but I found a spot once (late in fall), in a moist piece of woods, where they were in unlimited numbers under and among wet leaves. In the same region nearly a thousand specimens of *Platynus basalis* were taken on less than an acre of ground. Here, too, *Lathrobium armatum* Say was abundant ; nearly every log and bit of bark turned over yielded specimens. Many other species were abundantly represented.

———o———

The Nest and Parasites of XYLOCOPA ORPIFEX,* Smith.

By ANSTRUTHER DAVIDSON, Los Angeles, Cal.

In this section of Southern California four or five species of *Xylocopa* are found. This last season, while collecting with Professor Coquillett, of our National Division of Entomology, we for the first time discovered the nests of *X. orpifex* in abundance on Wilson's Peak, a mountain of 5000 feet altitude. At the time of our visits in June and August, 1892, we collected numerous specimens of the bees and their nests. While the nests do not seem to differ in many particulars from the nests of *X. virginica* as described by Packard in his well-known guide to the study of insects, yet there are numerous problems connected therewith which I wish the readers of the NEWS would throw some light upon.

I picked up one piece of wood four inches in diameter and about three feet long, and as there was but one external opening it is presumable all the cells contained therein were the work of one bee. From a diagonal entrance the tunnels were driven longitudinally a distance of three or four inches on each side. Parallel to this was another of a similar length, and a third very much shorter, the cells in all numbering twenty. The tunnel is not all of one uniform width, but is dilated in the centre of each cell, so that the tunnel measures three-eighths of an inch in diameter at the extremities, and half an inch at the centre of each cell.

The partitions are constructed in a manner apparently identical with those of *X. virginica*, but the ribbon-like coil has five complete whorls, and is one-eighth of an inch wide. After the par-

* From a paper read before the S. California Science Association.

tition is completed its angles are filled up with sawdust, and smoothed with a waxy secretion so as to make the bottom of the next cell oval or rounded. These cells have a uniform depth of five-eighths of an inch. Here I would like to ask if all the *Xylocopa* make their tunnels wider in the centre of each cell than elsewhere? I have been led to infer from the little literature I have available, that in the construction of their cells they retained some of the fragments wherewith to construct the partitions. This seems to me rather too rational even for the carpenter bee, and I thought I had solved the problem in supposing that in digging fragments for the formation of the partition the bee had unconsciously widened the succeeding cell. This theory is untenable, however, as I have found some apparently new tunnels with four or five cells constructed exactly as when filled, and besides the terminal cell is always so constructed.

I have frequently seen it stated that the *Xylocopa* turns the terminal cell towards the outer surface of the log so that the bee resulting from the egg first deposited, and presumably the first hatched, could eat its way out by a new channel. Whatever may be the habit with other bees it is certainly not so with the one in question, since all the bees here escape by the original opening in the inverse order of their deposition.

On opening many of the tunnels filled early in the season one or two of the external cells may be found empty, the bees having already made their escape. In the lower cells the bees though perfect and active, remain until the following Spring, when they break through the partitions and escape. In those built late in the Summer all seemingly remain until the next Spring.

How it happens that the bee resulting from the egg last deposited is the first to escape, when there must, of necessity, be weeks of difference in their time of deposition, is something I cannot satisfactorily account for. I am led to infer, by the fact of the external cells always containing males, and the lower ones only females, that the explanation in part lies therein. Probably the males hatch out in less time than the females or take less pollen to feed them, or it is very likely that both of these factors enter into the equalization of the incubating periods.

Fertile, though these insects are, yet on account of their many enemies and parasites, comparatively few of them reach maturity.

What the exact proportions are I regret I did not ascertain, but the number attacked by parasites was certainly very large. In one piece of wood in which were three short tunnels of two cells each, six cells in all, three cells contained bee-fly pupæ, one a Chalcid pupæ, and the remaining live bees. Although this is probably above the average, I do not think it is much so.

Chief among its enemies is *Argyramœba simson* Fab. We found numerous pupæ of this bee-fly in the cells and bred the insect.

It was interesting to observe this pupa, ever restless, with its rings of hooked hairs on its body preventing it going backward as it gradually wriggled itself through the partitions to the external opening, where it transformed, leaving its case hanging to the edge of the opening.

The other parasite found was the Chalcid, *Monodontomerus montivagus* Ashm., which deposits its eggs to the number of from ten to twenty in each cell. These do not destroy their host until it is about to transform into the pupa state, as is demonstrated by the amount of larval excrement so invariably found in the cell, for the larvæ of *X. orpifex* voids a large quantity of excrement, and while not an isolated example, as I have since discovered, I was not previously aware of bee larvæ so doing. In this, as in many other instances, some broods of *Monodontomerus* were all males, while other broods were all females.

---o---

NOTES ON THE CYNIPIDÆ.—I.

By H. F. BASSETT, Waterbury, Conn.

Even the most careless observer of Nature cannot have failed to notice the swellings and deformations which exist in great variety on the buds, leaves, flowers, fruits, stems and roots of trees and plants, and, if not already informed, to wonder what causes them.

We call them galls, and on examination find that most of them are the home of the larvæ of insects—larvæ developed from eggs laid on the plant by the parent insect before the gall existed.

The galls are produced by insects, but the interesting question —how? will be considered at another time.

The species of insects which are able to produce galls are quite numerous, and are found in nearly all the orders of this large class, but these notes will, unless otherwise stated, refer in all cases to such as belong to the order Hymenoptera, and to the family Cynipidæ.

The species of galls produced by the Cynipidæ are more numerous on the oaks than on plants of any other order; indeed, the oaks are noted the world over for the variety and abundance of the galls they produce. Our North American oaks are known to produce about two hundred species, and it is doubtful whether one-half have yet been noticed. I have gathered, at one time, from an oak standing alone in a cultivated field nine distinct species. All trees of the *same species* are not equally the producers of galls; indeed, of trees and shrubs whose branches interlace, one may be infested with thousands of galls, while the others produce none at all. Whether this is owing to what we may call the individuality of the tree that is found to be favorable or otherwise—for trees of the same species *have* individual traits, no two being alike—or whether a tree that the gall-flies have once attacked is, thereafter, more susceptible to the influences that produces the galls, or whether it is due to entirely different causes is not yet known.

I have studied the oaks with special reference to this subject and find that colonies of gall-flies are more or less persistent, some having been known to me for fifteen or twenty years and still existing. In one case I found that the Summer brood, hatched from leaf-galls, laid its eggs for the next generation in the bark of the large roots of the tree on which they grew, and that when the insects from the root-galls appeared they laid their eggs in the buds of the same tree.

I have taken at one time, more than fifty of these last in the act of egg-laying in the buds of two or three oak sprouts that sprung from a common root and were not much higher than my head. Other clumps of oak bushes a few feet distant furnished none at all.

This and some other facts of the same sort show that the female gall-fly discerns a special fitness for her work in certain trees, but does not show in what it consists. It is possible that the size and shape of the oak buds, which differ considerably on different trees, may have some influence in determining the insect's choice for

such species as lay their eggs in the buds. As these insects are generally winged, their localization does not depend upon their inability to reach other trees.

The Cynipidous galls are by no means confined to the genus *Quercus*, as a considerable number of species are found on plants belonging to the order Rosacæ—the blackberry, raspberry, wild roses and the genus *Potentilla*. The order Compositæ, and some others, also, furnishing gall-producing plants.

There are a vast number of galls on various kinds of trees and plants that are not produced by hymenopterous insects. These mostly belong to the order Diptera, and the family Cecidomyæ. In the perfect state they have two wings, and the larvæ are easily distinguished from the Cynipidæ. I mention this fact lest it be thought by the beginner in the study that these have been overlooked. Many kinds belonging to this class are sent me every year, and the senders are probably disappointed when I inform them that all the time I could devote to the study of galls for almost thirty years, not much it is true, has not enabled me to do more than begin the study of the hymenopterous galls, and that I have not even attempted to study those of other orders, which are no doubt equally interesting and equally difficult.

Baron Osten Sacken, in his first article, "On the Cynipidæ of the North American Oaks and their Galls," published in the first volume of the "Proc. of the Ent. Soc. of Phila., Oct., 1861," writes as follows on the study of the gall-flies: "The difficulties attending the study of the habits of the Cynipidæ are so great, the peculiarity and, I may say, the intricacy of their habits is so extraordinary, that the most important questions concerning them remain unsolved. The chief reason of the difficulty of this study is the close and persistent observation of nature it requires. Here, it is not sufficient to collect at random, in order to work out at leisure the material thus obtained; here one has to watch the growth of the gall on the tree for weeks and months; in order to be enabled to make certain observations one is bound to a certain season of the year and a certain locality, and if the season is missed or the locality cannot be reached at the requisite time, one has to wait a year before observations can be renewed." All this, and more, is true; still, the history of these little insects so far as yet known is so marvellous, that no difficulties, however great, can deter one who has begun the study of their habits.

Some of the "unsolved questions" referred to by Baron Osten Sacken have, since he wrote, been solved, or a way to their full solution discovered, but fields vast enough for a life-time of study remain to be explored.

THE Sugar Ant (*Formica omnivora* Linn.) appeared about the year 1760 in Barbadoes, and caused such devastations that, in the words of Dr. Coke, "it was deliberated whether that island, formerly so flourishing, should not be deserted." In 1763, Martinique was visited by these devastating hordes; and about the year 1770 they made their appearance in the island of Granada. Barbadoes, Granada and Martinique suffered more than any other island from this plague. Granada, especially, was reduced to a state of the most deplorable desolation; for, it is said, their numbers there were so immense that they covered the roads for many miles together; and so crowded were they in many places, that the impressions made by the feet of horses, which traveled over them, would remain visible but for a moment or two, for they were almost instantly filled up by the surrounding swarms. * * * Notwithstanding the myriads that were destroyed by fire, water, poison and other means, the devastations continued to such an alarming extent, that in 1776 the government of Martinique offered a reward of a million of their currency, for a remedy against the plague; and the legislature of Granada offered £20,000 for the same object; but all attempts proved ineffectual, until the hurricane in 1780 effected what human power had been unable to accomplish.—*Cowan's Curious Facts.*

THE Kermes-dye, or scarlet, made from the *Coccus ilicis* Linn., an insect found chiefly on a species of oak (*Q. ilex*) in the Levant, France, Spain and other parts of the world, was known in the East in the earliest ages, even before the time of Moses, and was a discovery of the Phoenicians in Palestine. *Tola*, or *Thola*, was the ancient Phoenician name for this insect, and dye, which was used by the Hebrews, and even by the Syrians. To the Greeks this dye was known under the name of *Coccus*, as appears from Dioscorides and other Greek writers. From the epithets *kermes* and *coccus*, and that of *vermiculus* or *vermiculum*, given to the Kermes in the middle ages when they were ascertained to be insects, have sprung the Latin *coccineus*, the French *carmesin*, *carmine*, *cramoisi* and *vermeil*, the Italian *chermisi*, *cremisino* and *chermesino*, and our *crimson* and *vermillion*.—*Cowan's Curious Facts.*

IN the "American Naturalist" for April (p. 400, 1), Mr. Nathan Banks holds that the maxillæ of insects represent the first maxillæ plus the maxillipedes of the Chilopods, and that the labium of insects equals the second maxillæ of Chilopods. He also suggests that the meso- and metathorax of insects are each composed of two segments, so that the entire thorax would consist of five segments, whereof one, three, and five bear legs, while two and four are provided with wings.

1004 - 15
3 - 11
2 - 13
1 12
11
9 - 10
8 - 9
7 - 8
6 - 7
5 - 6
4 - 5
3 - 4