

- (61) **Dixa fraterna** Garret:—†Bull River, October 10th (C. Garrett).  
 (62) **Dixa johannseni** Garrett:—‡Cranbrook, October (C. Garrett).  
 (63) **Dixa distincta** Garrett:—‡‡Cranbrook (C. Garrett).  
 (64) **Dixa simplex** Garrett:—‡‡Cranbrook, June, October (C. Garrett).  
 (65) **Dixa plexipus** Garrett:—‡‡‡Nelson.

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**References:**

- \* Dyar, H. G., Mosquitos of Canada, Trans. Roy. Can. Inst., Toronto, Vol. XIII, p. 1, 1921.  
 \*\* Dyar, H. G., Note on *Aedes aloponatum*, Insec. Inscit., Mens, vol. XII., Nos. 10-12, p. 178, 1924.  
 \*\*\* Dyar, H. G. and Shannon, R.N., American Chaoborinae, Insec. Inscit., Mens. vol. XII, Nos. 10-12, p. 201, 1924.  
 † Garrett, C., by letter Feb. 5, 1926.  
 †† Dyar, H. G., Insec. Inscit., Mens, vol. IX., Nos. 4-6, p. 79, 1921.  
 ††† Dyar, H. G., Insec. Inscit., Mens, vol. X., Nos. 4-6, p. 99, 1922.  
 ‡ Garrett, C., New American Dixidae (privately published) October 30, 1924.  
 ‡‡ Garrett, C., Sixty-one new Diptera (privately published) February 7, 1925.  
 ‡‡‡ Garrett, C., Seventy new Diptera (privately published) December 31, 1925.  
 § Hadwen, S., Note on occurrence and significance of Anophelinae in B. C., Proc. B. C. Ent. Soc. No. 5, p. 81, 1915.

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**SOME NOTES ON THE HIBERNATING HABITS OF INSECTS IN  
 DRY TREES IN THE INTERIOR OF B. C.**

BY A. A. DENNY

During the autumn of 1925, and again in 1926, my immediate chief, Mr. E. R. Buckell, received a request from the Dominion Entomologist, Mr. Arthur Gibson, to collect specimens of lacewing flies (Chrysopid species). as a result of a request which the Department at Ottawa had received for such material from Dr. R. J. Tillyard of New Zealand. Dr. Tillyard desired Chrysopid material to liberate in New Zealand in the hope that they would assist in checking certain species of aphids which feed upon oak and other trees.

Having lived in the Salmon Arm district for many years, I could recollect having seen large numbers of these dainty little insects during

our annual winter wood-cutting operations whilst on the farm. It was only in the driest of dead trees that these insects had been seen. Armed with an axe, my collecting bag, and a lunch, I set out for many a day.

At first I met with little success; later on I was able to find a fair number every day. In 1925 we sent about 2000, and in 1926 we sent off nearly 6000 of these lacewings.

It was during the collection of the Chrysopids that I came to find out what a number of interesting insects were to be seen in their winter quarters, thus rudely disturbed.

I commenced in the last few days of October, and continued until early December. During the latter part of this time the fact that snow was upon the ground rendered the work a little more difficult.

Some of the insects showed no great aversion to the damper situations, such as that usually found under heavy bark near the ground level; however, for the majority of hibernating insects it would seem imperative that they find absolutely dry spots in which to pass the winter.

The largest number of insects found belonged to the **Lepidoptera**. Of these some 23 species, out of a total of 28, were micro moths. Next came the **Coleoptera** with 16 species. The **Diptera** supplied some 11 species. Of **Hemiptera**, **Neuroptera** and other small orders there were 8 species.

The **Hymenoptera** supplied the least number of all, as I only found 6 species of this order.

Added to these insects there were quite a large number of spiders, large and small, also a few of the Pseudo-scorpions, these latter being taken under the bark on live fir trees.

Before going further, I should say that my primary object was the taking of the lacewings, and that I confined my search chiefly to trees which were favoured by them.

The type of tree usually sought out by most insects for their winter's rest is a dead dry one, preferably one with loosened bark and a certain amount of dry rotten wood under the thick slabs of bark.

The tree, to attain this state, is first of all killed by lightning, fire, or one of the many causes of death. This attracts the Buprestid and other boring beetles. For some years this tree, with its tightly clinging bark and damper inner wood, is the home of the various species of woodpeckers indigenous to our woods.

In a year or two the bark is riddled with holes made in search of the boring larvae. This allows the dampness to be evaporated, causing in its turn a drying and shrinking of the inner wood, thus loosening

the bark in large patches. The loosening and drying is followed by a gradual dry rotting of the outer layers of wood in contact with the air under the loosened bark. The thick bark keeps out the moisture from rain, snow, fogs and dew.

The tree has now reached the stage when it is in the best state to act as the winter home of all these insects needing snug homes in which to escape the storms and vicissitudes of a hard, cold winter.

Their most imperative need seems to be to keep dry; when dampened, disease and fungus growths soon destroy them.

It seems that the locality of such trees has a lot to do with the number of insects resorting to them. A tree growing in thick second growth and closely hemmed in by brush is not favourable. It is continually damp, and gets little sun, at least on its lower half.

The best type of tree is one growing on the north side of small openings in the bush. Here it will be protected fairly well from northerly winds, and, most important of all factors, it will receive the most possible sunshine during the long winter and early spring. A tree of this type always has very dry bark and wood on the south side, which is the side chosen by most of the insects which stay under the bark. Those that go deeper into the rotten wood and empty borer tunnels do not seem to prefer any particular side of the tree, as there they are protected from weather conditions of all kinds.

Taking these insects in the order enumerated, I will remark upon their habits as I found them.

The largest of the moths were the Noctuids, **Litholamia napaea** Morr, **Ufeus hultsii** Smith, and **Enargia decolor** Weac. These were mostly found in the larger empty borer tunnels and rotten cavities, always in dry positions. The many species of Micros were usually taken under the bark, chiefly in the dry places occupied by the Chrysopids. In all the trees I found thousands of specimens of the Willow Leaf Miner moth, **Lithocolletis salicifoliella** Cham. They seemed to prefer to congregate in certain places. It seemed that they were fairly hardy to the weather conditions, as hundreds spend their winter along the outer bark crevices on live as well as dead trees.

There has been an unusually severe infestation of the Willow trees in the Salmon Arm section by this Leaf Miner, and perhaps any kind of winter quarters were at a premium, thus accounting for their apparent carelessness. These small moths were fairly active when disturbed even at temperatures considerably below 32°F., although they did not seem willing to actually fly very much.

Of the Coleoptera there were 15 species. Two of these, namely **Cucujus clavipes** Fab., a flat red-bodied beetle, and **Dendrophagus glaber** Lee., a small brown flat-bodied beetle, seemed to like the damper

portions under the bark. Most of the 4 or 5 species of Coccinellids were taken under the heavy outer bark of large live fir trees.

The Diptera, though only supplying eleven species, were fairly plentiful in most trees.

One of the common "Blue Bottle" flies, **Phormia regina** Mg., was quite numerous. This fly seems to penetrate as far as it possibly can into the hard dry wood, using the old tunnels of the wood-boring larvae. In some of these galleries I would come across a long row of the flies.

It was peculiar how they usually sorted themselves out as to species, even though in quite a confined space. Some tunnels would contain up to twenty or thirty flies, usually half of these would be **Phormia regina** Mg. all together, with 5 or 6 of **Anacampta latiuscula** Lw., with their brown-banded wings, at the end of the row. Often these clusters of flies would be joined by small groups of **Muscina assimilis** Fall, and **Pollenia rudis** F. The two flies of **Macrorchis** spp. and **Melina ventralis** Fall were seldom found more than two at a time, being usually solitary.

While cutting into one short dead fir stump, which, though hard shelled, was dry and rotten inside, I noticed countless thousands of a small mosquito-like fly of a species of the genus **Exechia**.

Every crack and crevice in the stump seemed filled with the insects, which poured out in a continuous dark stream from the largest cavities. As the temperature that day was a little above freezing, many of them managed to fly away as they fell. It is interesting to note that apparently all these were females (although an examination of a larger number might possibly have revealed some males).

The Hymenoptera were represented by 6 species, one of the common ants, two species of yellow wasps and three smaller undetermined insects. The wasps were found to be rather gregarious, there usually being from 4 or 5 up to 15 in a place, in dry positions and well under cover.

The Hemiptera and Neuroptera supplied another 8 species. Of these, the large black shield-shaped Stink Bug, **Brochymena affinis** Van. D., was the least particular of any in his choice of winter quarters. These large bugs were quite common, being found in groups from one or two individuals up to twenty or thirty. They usually preferred to find a dry corner, either under the loosened thick bark of dead fir trees or inside old disused beetle tunnels.

On days when the temperature was above the freezing mark these large black fellows had to be treated with care and circumspection; when disturbed or touched by the collector's forceps, they lost no time in discharging with surprising accuracy a minute jet of whitish and

pungent smelling fluid. On frosty days they appeared quite immobile and unable to cause trouble.

Another member of the Hemiptera, **Leptoglossus occidentalis** Heid, was found occasionally in dry positions, sometimes alone or in twos or threes, although usually they were in company with the former bug.

By far the most numerous of all the insects were the Lacewings, for which I was primarily searching.

If the temperature was above 36°F., they took to their wings quite readily. Below this temperature and down to about 20°F., they seemed quite capable of crawling around, losing no time in disappearing from sight.

At this point I would note that this particular Chrysopid is absolutely odourless, whilst another species which I have frequently taken in the Kootenay section and elsewhere has the most objectionable odour it is possible to imagine!

These insects hibernate always in dry positions. They like to crawl into the longitudinal cracks always to be found in dry fir trees. In such positions they were almost inaccessible, as their removal necessitated the splitting of the whole tree.

Most of the lacewings which I took were found under the bark and in the crevices formed in the dry rotten wood around the base of the tree. In some cases, with trees 2 or 3 feet in diameter, this rotten wood extended in to within one foot of the center of the tree.

After chopping off all the bark within reach of the ground and working out any rim of rotten wood inside, the trees were chopped down. Lacewings and other insects were found to occur quite near the top of the tree, a matter of 100 feet or so. It was noted, however, that the majority occurred within the lower fifteen feet on most trees.

Sometimes the removal of one slab of bark would reveal a hundred or more of the gauzy-winged green Chrysopids. Many specimens in these large gatherings always escaped before being placed in the bottles used for their collection.

It was curious to note that in many places large numbers of their wings alone were found, showing that they were raided by some predatory enemy. Very often the lacewings and the large black stink bugs occupied the same tunnels in peaceful bliss. I rather believe that there must be warfare in the spring when activity commences.

Nearly all the trees used in this collecting work were Douglas fir trees. I found a certain number, however, in a few dry yellow pines examined. The lacewings seemed only to inhabit those trees which were sound enough in their interior to withstand the storms of winter.

On many occasions I noticed that trees which seemed otherwise suitable contained no lacewings. Invariably these trees had little sound wood left in the center, being easily chopped down. Instinct seems to advise them as to which trees are likely to be blown down during the winter, thus causing their death by becoming too damp upon the ground.

Similarly they avoid stumps less than about 20 feet in height, especially so if these stumps showed signs of weakness.

For shipment I placed the lacewings in glass fruit jars with muslin tops, one-quart jars holding about 1500 comfortably. Inside the jars I placed inverted paper cones, made by folding and refolding an 8-inch square of rough paper. This allowed the insects to crawl up into fairly natural crevices where they were out of sight and quite comfortable.

Below I am giving the complete list of names of all the insects I found hibernating in dry trees. Of these some of the Coccinellid beetles were taken from the bark of green fir trees.

#### Names of Insects found in Hibernation.

##### LEPIDOPTERA.

<i>Litholamia napaea</i> Morr.	<i>Agonopteryx rosaciella</i> Bsk.
<i>Ufeus</i> sp. near <i>hulstii</i> Smith.	<i>Cerostoma</i> sp. ( <i>radiatella</i> Don.?)
<i>Enargia decolor</i> Weac.	<i>Mompha unifasciella</i> Chambers.
<i>Epinotia crenana</i> Hon.	<i>Nothris</i> ( <i>Gelechia</i> ) <i>monella</i> Busek.
<i>Epinotia crenana</i> , form <i>medios-</i> <i>triana</i> , Kgt.	<i>Lithocoletis salicifoliella</i> Cham.
	<i>Ornedos hexadaetyla</i> Linn.

##### COLEOPTERA.

<i>Upis ceramboides</i> Linn.	<i>Dermestes signatus</i> Lec.
<i>Tenebrio molitor</i> Linn.	<i>Buis estriatus</i> Lec.
<i>Temnochila virescens</i> Fab. (var.)	<i>Microbregma emarginatum</i> Duft.
<i>Cucujus clavipes</i> Fab. (var.)	<i>Adalia frigida</i> Schn.
<i>Adelocera profusa</i> Cand.	<i>Adalia humeralis</i> Say.
<i>Ostoma ferruginea</i> L.	<i>Harmonia picta</i> Rand.
<i>Silpha lapponica</i> Hbst.	<i>Scymnus</i> sp.
<i>Dendrophagus glaber</i> Lec.	

##### DIPTERA.

<i>Eristalis tenax</i> L.	<i>Hebecnema vespertina</i> Fall.
<i>Muscina assimilis</i> Fall.	<i>Mellina ventralis</i> Fall.
<i>Anacampta latiuscula</i> Lw.	<i>Fannia incisurata</i> Zett.
<i>Epochra rubida</i> Coq.	<i>Exechia</i> sp.
<i>Phormia regina</i> Mg.	<i>Macrorchis</i> sp.
<i>Pollenia rudis</i> F.	

**HEMIPTERA, NEUROPTERA, Etc.**

Brochymena affinis Van. D.	Banasa sordida Uhl.
Leptoglossus occidentalis Heid.	Lycetocoris sp.
Agallia sanguinolenta Prov.	Hemerobias sp.
Cicadella hieroglyphica var. confluens Uhl.	Chrysopid sp.

**HYMENOPTERA.** (Undetermined).

- 2 species "Yellow Jacket" wasp.
- 1 species of ant (winged and wingless).
- 3 other small hymenopterous insects all less than  $\frac{1}{4}$  inch in length



A DEAD DOUGLAS FIR  
SHOWING WHERE LACEWINGS ARE FOUND.  
—(Original.)