

One pupated on July 28 in a silken cocoon spun in a fold of paper.

Pupa

Size 15 mm by 4 mm. Slender, wriggled actively when touched; wing-cases dull, fuscous; A. segments smooth, shiny, sparsely punctate on anterior borders, medium brown; cremaster two larger hairs with re-curved tips and about six smaller

similar ones at the base, all set on a rugose projection at the tip of the last segment.

Remarks

This larva is an excellent example of twig simulation in form, colour, and attitude, especially when resting with its body held out at an angle of about 45° to the twig.

SOME RECORDS OF LYCTIDAE IN VANCOUVER

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In the Proceedings, Vol. 4, pages 129-148, of the Seventh Pacific Science Congress held in New Zealand, February 1949, under the heading Regional Pest Faunas, is an article "The more important Insect Pests of British Columbia" assembled by K. M. King from contributions by H. Andison, E. R. Buckell, R. Glendenning, J. D. Gregson, K. M. King, J. Marshall and H. A. Richmond, all of the Federal Entomological Laboratories in British Columbia.

On page 147 of this paper is the statement "structural timber is not, on the whole, subject to any extensive damage by insects. However, on the coast, powderpost beetles, *Lyctus* species, have in a number of instances heavily attacked house timbers, occasionally necessitating the replacement of cellar beams."

I have been interested in household insects in this Province for many years especially those attacking structural timbers and have not yet come across an instance of this sort since all our wooden buildings are of native soft woods; also in the past 20 years I have inspected many buildings suffering from insect attack and have found that if a species of *Lyctus* was present, it occurred only in timber imported into the Province as flooring, veneer, panelling or carved ornaments and that building timbers were attacked NOT by lyctids

but by native and introduced anobiid beetles, termites and carpenter ants; the emergence holes of lyctids and anobiids are very similar, hence the mistake.

The family Lyctidae² is tropical or semi-tropical containing only 66 species known so far, included in 12 genera of which 10 occur in the New World. The genus *Lyctus* contains 25 species; other genera, 41 species. So far in Vancouver I have taken five species of *Lyctus* and one of *Trogoxylon*, making six in all. However, according to distribution lists in Gerber's monograph and in Hatch's Vol. III of the Beetles of the Pacific Northwest, seven species have so far been found in this Province, one being a single record.

Considering these species alphabetically, we have:—

Lyctus africanus Lesne

In June 1963 an importer of medicinal herbs brought in a pint of orris roots in which a few holes were showing; in a few days some beetles emerged which traced out to *L. africanus* Lesne which is very similar to *L. brunneus* except that the fourth abdominal sternite of the female has a dense conspicuous fringe of hairs. The insects are still actively breeding in the orris rhizomes in about equal numbers of males and females (March 1965),

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² Gerber, Eugene J. The New World Species of Powder-post beetles belonging to the Family Lyctidae. U.S.D.A. Technical Bulletin No. 1157, Wash., D.C. April, 1957.

and have reduced much of the roots to dust. Orris or orrice roots are the rhizomes of three varieties of *Iris*, cultivated in France, Italy and Morocco and are imported into North America for making a hair tonic and into Vancouver as one of 14 flavors used in making London Dry Gin and therefore this beetle can definitely be considered a hostile species and a menace to our conviviality. It is the most active of four species of lyctids that I have reared out in captivity and if the lid is removed from the container it flies out readily instead of crawling out as other species do.

Other record of *L. africanus*:—four specimens emerged on 5 May 1953 from a child's toy made of liquorice wood, *Glycyrrhiza lepidota* (Nutt.) Pursh, imported from California; one, on 9 October 1955, from a figurine from Kenya and 18 specimens from one panel only of an insect spreading board purchased from a supply company. The board lay around in the laboratory for three years before beetles started to emerge from it and the latest one emerged on 14 March 1964. Both halves of the board are made of "obeche" wood *Triplochiton schleroxylon* imported from west Africa, identified for me by Professor R. W. Wellwood of this University who stated that the wood is well known to have a high sugar content (a necessity for lyctid attack).

Also from this same side of the board there emerged from 28 January to 15 March 1965, 34 specimens of *Lyctus brunneus* (Stephens) and from 26 November 1963 to 8 October 1965, 8 specimens of *Trogoxylon prostomoides* Gorham, all from one strip of wood 12 ins by 2 ins by 5/8 inch thick. Just when this strip was infested by each species is anybody's guess.

Lyctus brunneus Stephens, the Old World Powder Post beetle.

This species ranges in color from medium to dark brown and is only slightly smaller than *L. planicollis*,

the largest lyctid to occur in the Province.

The first specimen was obtained in spring 1934 from thin bamboo rods from Japan. The next three, obtained 3 January 1955 and 9 on 14 April 1955, came from a window blind of thin round bamboo strips of not much greater diameter than the beetles themselves. In April 1958, 18 were obtained from mahogany panelling that had been installed in a house for one year; in 1963, 10 from orris root and the last group of 34 from the obeche wood spreading board as recorded for *L. africanus*, making 79 in all.

Lyctus cavicollis Le Conte, the Western Powder Post beetle.

On 20 July 1955, a druggist brought in a handful of bamboo cigarette holders (source unknown but probably from China) which were heavily perforated by tunnels; from these emerged only two beetles which key out to *cavicollis* in Hatch's keys³, having a narrow prosternal process between the pro-coxal cavities instead of a broad one as in *planicollis*.

Lyctus fuscus Linn. 1758 (*Lyctus linearis* Goeze 1777) the European Powder Post beetle.

This species was my first record of *Lyctus* in Vancouver, obtained on 14 May 1926 from a hickory axe handle imported from Arkansas; the importer said he had a bushel of handles from which beetles were emerging but he brought up only one which I placed on a radiator and in short order, six beetles emerged. These were identified for me by the late Ralph Hopping who returned me only one specimen. It is amazing that any beetles can develop in hickory which is almost as hard as ivory but close examination shows that the tracheae are quite large and where these occur in any hardwood, the females insert their astonishingly long ovipositors and deposit eggs. If

³ Hatch, M. H. Beetles of the Pacific Northwest, Vol. III. University of Washington Press, Seattle, Wash.

the tubes are slit open, the beetles press the elongated eggs lengthways into the grooves. Close-grained wood like maple is consequently free from attack by lyctids as is any wood which is varnished or painted to close the tracheae.

Lycтус planicollis Le Conte, the Southern Powder Post beetle.

This is the largest lyctid to come into this Province and the darkest, some being nearly black; females may measure 5.5 mm in length. This is the chief species attacking oak and was a problem during the second World War when oak for flooring was either improperly kiln-dried or not dried at all. I have 17 records of this beetle in oak flooring dating from 1950 to 1960 involving shipments from Cookeville, Tenn. and Calico Rock, Arkansas. One firm alone in Vancouver averaged importations of 13 acres per year of oak flooring, mostly from Arkansas and within one or two years of being laid, the floors produced beetles. The oak came in two forms, as 16-foot planks which were sawn locally into 3-inch wide strips for first flooring, and bundles of tongue-and-groove short ends $\frac{3}{4}$ inch thick for bedrooms; these short ends 2 or 3 inches wide and 12 to 16 inches long were most heavily infested, sometimes necessitating the entire re-laying of a bedroom floor.

I conducted many experiments with fresh non-infested wood and varying numbers of beetles, under varying conditions of humidity and temperature but was never able to get a fresh infestation started; the last of these experiments was discarded in 1963 having allowed four years for a new generation to develop.

Apart from 72 pinned specimens, I have a good reserve of this species in alcohol.

Lycтус opaculus Le Conte

In the Stace Smith addition to our collections is one specimen collected in Vancouver on 9 July 1930, identified in 1944 or 1946 by H. B. Leech as

L. opaculus, in 1957 by M. Hatch as *L. planicollis* and in 1964 by Spencer as *L. brunneus*; definitely it is not *opaculus* and contains characteristics of all three species.

Also in the Stace Smith collection is one specimen collected 21 July 1934 by W. Mathers from "seasoned African wood" in Vancouver and identified by H. B. Leech as *Minthea stichothrix* Reit. without further details.

Finally is the species *Trogoxylon prostomoides* Gorham, the smoothest-looking of the species on hand, with only traces of elytral ridges and confused traces of pubescence on the elytra. My first record was 4 specimens (identified by Hatch) from a Mexican bamboo basket, on 27 January 1947. On 21 July 1961, 8 specimens emerged from Monkeypod (*Samanea saman* Jacq.) wood bowls brought in from Hawaii; on 5 Dec. 1961, 2 were sent in from a bamboo basket in Vancouver and on 20 Nov. 1962, 3 were sent in from a North Vancouver home where the owner could not find the source of the beetles.

On 2 Nov. 1962 a citizen brought in a Mexican bamboo basket which showed a few emergence holes; in the laboratory it produced a steady stream of beetles which averaged 10 per week from Dec. 1963 to March 1964, when it was discarded. On 22 April 1963 a man brought in one beetle which had emerged from a $\frac{3}{4}$ inch oak strip from a floor. From 4 April to 9 May 1963, 13 beetles emerged in the laboratory from a carved Mexican figurine of unknown wood. On 26 November 1963, 6 were obtained from the insect spreading board of west African obeche wood, previously noted. On 3 March 1964, one specimen was sent down from Powell River in a mass of termite frass; the beetle must have come from a bamboo basket and was accidentally included in the frass. On 17 March 1964, 20 specimens were sent in from Coquitlam which were in process of emerging from the half-inch thick panelling of American ash

in a large living room. Emergence of this brood from the ash started precisely 2½ years after the house was built and had continued up to the time the beetles were first sent in for identification. The emergence from the panelling became so general by the end of September 1965 that the owners had it all ripped off, the area behind it thoroughly sprayed with a 1 per cent solution of lindane in oil and the panelling replaced by plywood of a different species of wood. The danger from this infestation lies in the fact that several beetles have emerged from the polished oak flooring nearest to the infested panels, one from the next room and one from a room beyond that. Apparently the beetles spread under the subfloor and the extent of their infestation from the underside of the oak flooring may not become apparent for several years.

Now it has long been known that beetles of the family Lyctidae are attracted to wood of a high sugar content, so *T. prostomoides* in a container were given grains of cane sugar upon which they fed for periods up to one hour, apparently by licking it.

To test the possible selectivity of this species, one small block each of fine grain, hard, eastern European oak, Arkansas oak flooring, coarse-grain northeastern American oak possibly from Ontario, 40-year old hickory and chips of the same ash were placed into a can and some 16 adults of both sexes were carefully dropped on to the blocks. A few

grains of sugar were then placed on the block of hickory and wetted with a drop of water which sank into the wood as if it was blotting paper. The beetles remained longer on the surface of this sugared hickory than on any of the other blocks. In 12 days all the beetles had died so 18 new living ones were dropped on to the blocks. It may be several years before the results of this test are known.

On 8 February 1965, six specimens were sent in from Keremeos where they were emerging from Bongo drums purchased in Mexico; identity of the wood in the drums was unknown.

This species, *Trogoxylon prostomoides*, has occurred in Vancouver in more species of wood than any other—in bamboo from China or Japan, in monkeypod wood, heavily in bamboo from Mexico, in oak, in Mexican hardwood, in African obeche wood and in eastern American ash. It seems to be the one species of Lyctid beetle that may become acclimatized and capable of developing in hardwood in British Columbia.

To my knowledge, NO softwood has ever been attacked by *Lyctus* beetles in British Columbia.

Finally, a ninth species is emerging (November 1965) from boards of a packing case recently received from south India. It closely resembles *L. brunneus* in elytral and leg characters but the front and vertex are different. It is being cultured out in the same way as *T. prostomoides* to see if it will attack hardwoods other than the so-far unidentified wood from which it is emerging.