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INSECTS AFFECTING FOREST PRODUCTS and OTHER MATERIALS

A consideration of the damage inflicted by insects and their near relatives to timber and timber products both raw and finished, in storage or in final placement, together with a brief discussion of similar damage to metals and concrete.

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CHAPTER IX

Order HYMENOPTERA

The Bees, Wasps, Ants, Horntails and others.

This order is a large one and mainly beneficial since it contains a vast number of species which are parasitic on injurious insects. There are, however, a few families containing species which feed on, or work in wood. Some of these work in such a manner as to cause defects.

Members of the order are characterized by having four membranous wings (some forms wingless) with very few cells. In flight the rear wings are fastened to the front pair by a series of hooks. Mouth parts of the adults are fitted for either biting and rasping or sucking. The ovipositor is often modified into a sting (bees and wasps), a saw (saw flies) or a piercer (horntails). Metamorphosis is complete and the larvae are of various forms such as maggot-like, slug-like, caterpillar form or boring form; they are usually legless but not always so.

Occasionally a species which is not usually a wood borer will be found in wood. Such a case was reported by Becker and Sweetman (14): a leaf feeding saw fly, Macremphytus tarsatus was discovered boring in soft wood structures to pupate.

The destructive forms include gall makers, defoliators and wood borers. Many of the latter cause defects in wood.

Family SIRICIDAE The Horntails. (6), (9), (10) and (12)

The members of this group resemble saw flies in many respects but may be distinguished by the presence of only one spur at the tip of the foreshank while the saw flies have two.

The larvae are all wood borers or live in the stems of plants. Many forms boring into the trunks of living and dead trees. The larvae (Fig. 84) are cylindrical, wrinkled and possess a spine at the posterior end of the body.

Horntails once seen are not likely to be mistaken, either in the larval or adult stage, for any other insect.

The adults get their name of horntails from the horn or needle-like ovipositor of the female (Fig. 32) which is straight, heavy and about as long as the abdomen.

Typical Life History

The typical life history requires a little over two years. The adults emerge in the summer and are present from early summer to early fall, some having been found flying as late as November. The females seem to far outnumber the males.

For oviposition the females prefer freshly felled or dying trees, although Sirex juvencus has been reported as doing considerable damage to healthy stands of Pinus radiata in New Zealand. In most cases the siricids do not appear to be monophagous as various species will work in several species of trees.

The female lights on the trunk of the tree and explores the surface with her antennae. When she finds a suitable place she proceeds to drill with a saw-like movement of the ovipositor. The first hole may not be just right and she may drill two or three before one suits her. When the oviposition tunnel, which may vary from 6-20 mm., is finished the eggs are deposited before the ovipositor is withdrawn. The number of eggs per tunnel may vary from one to six or seven but three or four is average. The eggs which are deposited one above the other are about .36 mm. in diameter and 1.5 mm. in length; they fit loosely on end in the tunnels.

At the time of oviposition the adult horntail also deposits fungus spores which start growing before the eggs hatch, and apparently produce an enzyme which makes the wood particles digestible. The incubation period for the eggs is from 3-4 weeks.

The young larvae are 1-2 mm. long with a body surface which appears smooth and shiny, but in reality each segment has several hairs on it. The head is overhung by the prothoracic segment, is dome shaped, smooth, shining and directed ventrally. The mature larvae have three segmented antennae with the terminal segment pointed. The caudal end of the larva is terminated by a spine which, it is believed, serves for packing dust in the tunnel and as a terminal support.

About 21 months are spent in the larval stage. The young larva starts boring at right angles to the horizontal oviposition tunnel and remains in the sapwood for 6 to 8 months before moving into the heartwood. The larva usually makes a loop from the sapwood to the heartwood and back to the sapwood before it pupates. The larval tunnels may vary from 6-30 inches in length for various species. Cutting infested trees for lumber may prolong the length of life of the larval stage by a year or more. One case is cited by Levick (1926) in which an adult bored its way out through a bolt of cloth which was wrapped around a piece of seasoned wood.

The larva pupates about 1/2 inch from the surface of the wood and remains in the pupal stage 5-6 weeks. If pupation takes place too far below the surface of the wood the adult may die where it emerges from the pupal case.

Members of the family are attracted to forest fires and it is not unusual to find them ovipositing in smoking logs, material too hot for the bare hand to touch, whether or not eggs deposited in such situations hatch is not known.

Although the horntails live a secluded life boring in the sap and heartwood they are not free of natural enemies. In fact one subfamily of Cynipidae the Ibalinae are specialists in locating and parasitizing the wood boring larvae of Sericidae and have no other known hosts. The same is true of the members of the genus *Rhyssa* (10) and *Megarhyssa* (tribe Rhyssini) family Ichneumonidae. All species of these genera are large parasites with long ovipositors with which they pierce the bark and deposit eggs on or near the wood boring siricid larvae.

Below will be found short accounts of some of the more important wood boring species of Siricidae.

Western horntail *Sirex areolatus* (Cresson) This is one of the largest species. The female is from 1 1/4 to 1 1/2 inches long; metallic blue; the male is only half as large and often has reddish markings on the abdomen and legs. The full grown larva reaches a length of about two inches.

Almost any coniferous trees will serve as a host. Cypress, cedar and redwood seem to be preferred but pine, Douglas fir and noble fir are attacked. Essig (9 p. 771) states that it attacks

redwood lumber, having been taken in yards in Mendocino and Humboldt counties in California.

Distribution: Rocky mountain and Pacific coast states.

***Sirex cyaneus* (Cresson)** This species is very similar to the last and is considered a race or variety of *areolatus* by some workers. It inhabits British Columbia. In addition to attacking trees it is also reported as boring in wooden tanks at Powell River, B. C.

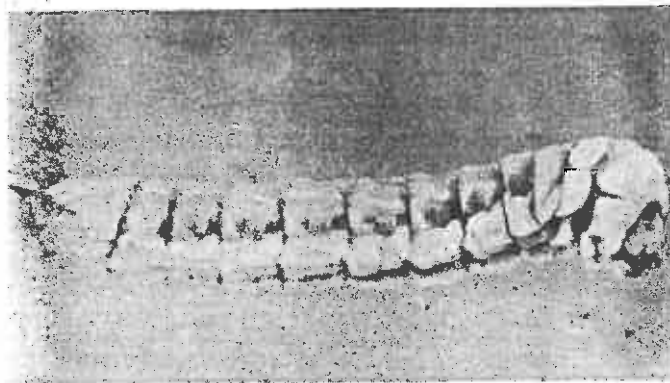


Fig. 84. Typical larvae of a horntail.

Behreir's horntail. *Sirex behrensi* (Cresson). A blue-black species with reddish marks on antennae, legs and the two basal segments of the abdomen. About as large as *S. areolatus*. Lives in conifers in southern Oregon, California and Nevada.

The polished horntail *Sirex juvencus*. (Linn.). This species is about one inch long, metallic blue with reddish legs. The larvae bore in various conifers. This is one of the most widely distributed species, ranging from the Atlantic to the Pacific coast and into Canada.

The white horned urocerus *Urocerus albicornis* (Fab.) (4 p. 667) A black species with a few white spots on legs, antennae and abdomen.

Range similar to the last. Larvae bore in coniferous trees.

The California horntail, *Urocerus californicus* (Norton). This is the largest (Fig. 85) and the most common species in the Pacific states. The yellow or orange wings make it conspicuous.

The female is black and shining with spots of yellow on abdomen, cheeks and tibia. In the male the thorax is brownish or reddish, the wings are orange-yellow and the abdomen is reddish yellow.



Fig. 85. Adult female Urocerus californicus

It is found attacking conifers (Pseudotsuga, Abies and Pinus) in the Rocky Mountain and Pacific Coast states.

The pigeon tremex Tremex columba (L.) This is probably the best known species of Siricidae and is found throughout the coniferous region of the United States where the larvae bore in various species of broadleaf and coniferous woods.

The adult is large, black with various markings of red and yellow on the thorax; antennae yellow at the base and black at the tip, legs yellow with black bands.

The following species Urocerus flavicornis (Fab.), Xeris morrisoni (Cresson) and X. spec-

trum (L.) are found throughout the Rocky Mountain and Pacific Coast states. U. flavicornis is slightly smaller than U. californicus with body and wings both dark. It is almost as common as the latter and is found in the eastern states as well as in the west.

Family XIPHYDRIDAE

This family is very closely related to the Siricidae.

Xiphydria mellipes Harr. (X. provancheri Cress.) (4 II p. 465)

The adult is a jet-black species with light yellowish markings on the dorsum around the mouth parts, on the head, at the base of each wing and laterally on each abdominal segment from the third to the sixth and on the eighth; length about 5/8 inch and wing expanse one inch.

The larvae are creamy white with dark mouth parts; rudimentary thoracic legs, abdomen tip red with a short dark spine; dorsum and anal plate deeply furrowed along the median line.

The work consists of mines up to 1/8 inch in diameter penetrating the heartwood.

Host: Birch which is dead and starting to decay appears to be the preferred host.

Range: Eastern states from Maine to New York and in eastern Canada.

Pammegischia xiphydriæ Ashm. is a parasitic enemy of this borer.

Family XYLOCOPIDAE (1), (3), (7) & (9)

The Carpenter Bees

Members of this family are large and robust resembling bumble bees. The female carpenter bees do not have the yellow markings, nor do they possess pollen baskets on the hind legs, but instead have a dense brush of hairs. The color is usually metallic blue-black, purplish-black, often with green reflections. The antennae of the male is composed of 13 segments; that of the female has but 12.