CWPA Proceedings, 2006, pp 77-78

SPECIAL SESSION: INSECT PROBLEM AND CONTROL MEASURES- Ambrosia beetles

John A. McLean,
Department of Forest Sciences,
University of British Columbia,
#3034-2424 Main Mall,
Vancouver, B.C. V6T 1Z4
(604) 822-3360; john.mclean@ubc.ca

The major species of ambrosia beetles that attack conifer sawlogs in western North America, are the striped ambrosia beetle, *Trypodendron lineatum*, the scratched-face ambrosia beetle *Gnathotrichus sulcatus* and its close cousin *G. retusus*. These species are regularly surveyed for around dry land sorting area, log boom storage areas and sawmills using pheromone-baited traps and by visual inspection. Several other ambrosia beetles are found in lesser numbers including *T. betulae* (birch, alder), *T. retusum* (poplar, spruces), *T. rufitarsus* (spruces, pines), *Xyloterinus politus* (hardwoods) and *Xyleborus dispar* (conifers).

The most numerous ambrosia beetle is *T. lineatum* which over winters in forest duff and flies in a mass flight in the spring as soon as temperatures are above 16°C to find recently felled trees or logs. They mate and set up galleries in the outer sapwood of logs. *T. lineatum* requires 324 Day degrees above a developmental threshold of 12.34°C to reach maturity. This can occur as early as mid-July and from then on new brood beetles will emerge from the log and be blown by the wind into nearby forest margins where they go into the duff to over winter. *Gnathotrichus* beetles, by contrast, remain in the galleries for the majority of their life. New brood beetles emerge in spring and late summer and disperse to find new logs in which to set up new galleries. Gallery success is greater on the underside of logs where there are more successful galleries and more brood per gallery. A video clip illustrating ambrosia beetle biology can be seen at http://www.forestry.ubc.ca\fetch21\fetch21\tinybeetles.html.

The galleries excavated by ambrosia beetles stain black from the growth of ambrosia fungi. This make the pinholes very obvious in boards cut from the sapwood of an infested log and results in considerable loss of value. In 1990-92, an Ambrosia Beetle Task Force was set up by UBC, MacMillan Bloedel Ltd. and Phero Tech Inc. to determine the value loss caused by ambrosia beetle attacks of their log inventory. All of the white wood (Douglas-fir, western hemlock, spruces and true fir) logs were surveyed for ambrosia beetle attacks at all the dry land sorts on the BC Mainland Coast and on Vancouver Island to gain a measure of the degree of attack being sustained in the forest settings. Many of the log booms were checked again in front of the sawmills to determine if there had been any increase in attack during transit. Systematic sawmill

studies were made to determine the degrade losses per cubic metre on at least 60 logs of each log grade.

Most infestation (85%) was determined to have occurred in the forest settings emphasizing the need for better scheduling of harvesting and loading out of the logs. A small amount of attack occurred in log booms tied up against forested foreshores. It is recommended that high value booms are stored well away from forested margins. Highest value saw logs returned $\$159/m^3$ in lumber values when infested with ambrosia beetles as compared to $\$228/m^3$ when the logs were free of attack. The total degrade on the annual production of 5 million m^3 of all log grades was estimated to be more $11 million. A video showing details of the Ambrosia Beetle Task Force can be seen at the above cited URL.

Pheromone-baited 12-funnel Lindgren traps have been set out around the new custom cut sawmill at the UBC Malcolm Knapp Research Forest in Maple Ridge, B.C. This mill is set among second growth forest that has an abundance of forest duff for over wintering *T. lineatum*. Mass-trapping is one way to reduce the build up of pest populations in such an area. Traps captured 45,000 *T.lineatum* during the peak spring flight. Totals of 77,000 and 104,000 were caught in 2005 and 2006 respectively. A review of the spatial distribution of these catches around the sawmill indicated areas where additional traps might be deployed in 2007. The major catches of *G. sulcatus* were made in the spring of each year with an additional fall catch in September 2006. Total catches of *G.sulcatus* were 16,000 and 24,000 in 2005 and 2006 respectively. Logs wereseen to be infested in spring 2006. These logs were not utilized until October which gave plenty of time for the completion of a brood during the summer. Log inventories need to be managed carefully to reduce the opportunity for ambrosia beetle brood production.

A brief account was also given of the phytosanitary concerns about insects such as the ambrosia beetle species which can continue to rear brood in lumber while it is in transit to market. Both *T. lineatum* and *G. sulcatus* have been intercepted in Australia for example. Our Canadian Food and Inspection Agency inspectors regularly intercept ambrosia beetles in dunnage used to secure shipping cargoes. Heat treatment of dunnage appears to be more reliable that fumigation with methyl bromide. It is recommended that shippers effectively treat their dunnage to prevent the spread of unwanted insects (and diseases) into new areas.