

Michigan for at least 5 years. The State of Michigan has imposed a quarantine to restrict movement of ash trees, firewood, nursery stock, and other articles that could spread the pest to new areas. Surveys to determine the extent of the infested area are underway.

The emerald ash borer attacks green, black and white ash trees, which are widely planted shade trees in the Midwest. It frequently kills nearly all the ash trees in areas where it lacks natural predators. The insect's larvae tunnel under the bark in late summer and fall, disrupting the phloem layer and often causing death within 2 to 3 years.

To control these substantial, recently analyzed pest risks, we propose to adopt the IPPC Guidelines. Taking this action would promptly address a weakness in our current regulations and improve protection of our natural and agricultural wood resources. It would also make U.S. SWPM requirements consistent with those of our major trading partners, who intend to adopt the IPPC Guidelines soon.

#### *Efficacy of the IPPC Guidelines Treatments*

The IPPC standard-setting process, discussed earlier, established the efficacy of the treatment standards recommended by the IPPC Guidelines. A great deal of research also supports the effectiveness of the treatments in the IPPC Guidelines for controlling risks associated with target pests than can move with SWPM.

#### *Evidence of Effectiveness of the Heat Treatment in the IPPC Guidelines*

The Asian longhorned beetle (*Anoplophora glabripennis*) or ALB is often used as a representative species for detailed assessment of the effectiveness of heat treatment. Recently completed and ongoing studies on both ALB and *Monochamus* species (a species of similar size and life cycle used as a surrogate for ALB) have confirmed that heat treatment to a 56 °C core temperature for 30 minutes is 100 percent effective against ALB larvae in wood.

Early experiments on heat treatment to a 56 °C core temperature for 30 minutes focused on eradication of pinewood nematode (Dwinell 1995, 1997). Dwinell (1997) cites a trilateral study involving Canada, the United States, and the European Union (EOLAS, 1991), which concluded that heat treating unseasoned lumber to a core temperature of 56 °C for 30 minutes eradicates the pinewood nematode and pine sawyer beetles.

Heating lumber from many species of wood at a core temperature of 56 °C for 30 minutes eradicated the pinewood nematode and pine sawyer beetles (Family *Cerambycidae: Monochamus*) (USDA, 1994). The genus *Monochamus* is a host of the pinewood nematode.

Pine sawyer beetle, *Monochamus* spp., belongs to the Family *Cerambycidae*, the same family that contains the ALB. Dwinell (1997) also indicated that heating infested Virginia pine logs to a core temperature of 53 °C for 30 minutes killed all pine sawyer beetles and all pine wood nematodes.

#### *Evidence of Effectiveness of the Methyl Bromide Fumigation Treatment in the IPPC Guidelines*

There are differences between the methyl bromide dosages over time required by the IPPC Guidelines and those currently required by the APHIS Plant Protection and Quarantine Treatment Manual. The dosage the Treatment Manual requires to be maintained over a 16-hour period is consistently higher than that required in the IPPC Guidelines. However, both treatment schedules effectively destroy the target pests for SWPM.

The U.S. Department of Agriculture (USDA), in collaboration with China, performed studies of methyl bromide fumigation of the Asian longhorned beetle that demonstrated 100 percent mortality of ALB larvae and pupae (Mack, 2002 per. comm). These studies used 10 cm square by 1.15 meter long wood timbers of *Populus* spp. exposed to methyl bromide for 24 hours at four concentration-temperature combinations: 80 mg/l @ 4.4 °C; 64 mg/l @ 10.0 °C; 56 mg/l @ 15.6 °C; and 48 mg/l @ 21.1 °C. In all cases, 100 percent mortality of ALB larvae and pupae was observed. The methyl bromide dose in these studies was greater than the one in the IPPC Guidelines. However, a prediction of the level of mortality of ALB using a Polo Probit 9 computer routine (Robertson 1997) indicated that 99.714 percent of ALB larvae would be killed after 16 hours at 15.6 °C with a cumulative CT (concentration x time) of 347. This is very close to the IPPC standard of a cumulative CT of 388 at 16 °C and 16 hours exposure; it is considered biologically equivalent. At 21.1 °C at 16 hours exposure and a cumulative CT of 293 (*i.e.*, the IPPC Standard), the predicted mortality level using the Polo Probit 9 computer routine (Robertson 1997) was 99.984 percent. Experiments by USDA at lower temperatures (*e.g.*, at 11 °C) confirm the effectiveness of the full range of optional IPPC temperature levels.

Also, although the above studies employed a methyl bromide dose greater than the IPPC Guidelines, the experiments were performed using a "most risk scenario." For example, the wood was in larger pieces than is typical of SWPM, and was green wood, with a much higher moisture content than typical SWPM. Increased moisture and size both cause significant resistance to fumigant penetration. Also, in these studies, only wood was fumigated in the chamber, while most SWPM fumigations consist of about 35 percent SWPM and 65 percent cargo. The cargo is usually non-sorbitive materials, which increases the exposure of the SWPM to methyl bromide and increases the effectiveness of the treatment. These experiments provide evidence that fumigation with methyl bromide over the IPPC temperature and dosage ranges is effective against ALB in wood (Barak, 2002 per. comm). Other experimental evidence includes McMullen (1952), Michelsen (1964), Hanula and Berisford (1982), and Yu *et al.* (1984), among others.

#### *Proposed Changes to the Regulations to Adopt the IPPC Guidelines*

In order to incorporate the IPPC Guidelines into our regulations, we propose to amend "Subpart—Logs, Lumber, and Other Unmanufactured Wood Articles" (7 CFR 319.40–1 through 319.40–11), as follows.

We do not propose to make any changes in the definitions in § 319.40–1. The definition of *solid wood packing material* would remain unchanged, and SWPM would continue to be included in the definition of *regulated article*. This means that SWPM, except for types that have received more than primary processing (*e.g.*, plywood, particle board, oriented strand board, veneer, or other processed types of SWPM), would continue to be subject to the regulations.

We do not propose to make any changes to § 319.40–3(a), which exempts SWPM (and other regulated articles) from Canada and border States in Mexico adjacent to the United States from most of the requirements of the regulations.<sup>7</sup> The Canadian exemption

<sup>7</sup> On June 11, 1999, APHIS published a proposed rule in the *Federal Register* (Docket No. 98–054–1, 64 FR 31512–31518) to eliminate this exemption for many types of regulated articles, including SWPM, from Mexican border States. This proposal was based on a recent pest risk assessment that challenged the premise that, because forests in the United States share a common forested boundary with adjacent States in Mexico, the two countries' forests share, to a reasonable degree, the same forest pests. The pest risk assessment concluded that a significant pest risk exists in the movement of raw wood material into the United States from the adjacent States of Mexico, because certain forests in