# Dampwood Termite

**Assessor**—Michael Haverty

**Scientific name of pest**—*Porotermes adamsoni* (Froggatt) (Isoptera: Termopsidae)

**Scientific names of hosts**—*P. adamsoni* infests live trees in eucalypt forests, particularly in high quality *Eucalyptus delegatensis* and *E. regnans* forests. It can also cause damage to the heartwood of *Pinus radiata* D. Don, *Araucaria cunninghamii* Aiton ex D. Don, *Ceratopetalum apetalum* D. Don, and *Nothofagus cunninghamii* (Hook.) Oerst.

**Distribution**—*Porotermes adamsoni* has a wide distribution in southern Australia. It is found in coastal and adjacent highland areas from southern Queensland west to South Australia and south to Tasmania (Gay and Calaby 1970, French 1986, Elliott and others 1998).

**Summary of natural history and biology of the pest**—All species of termites are social insects and live in colonies. Some species of the higher termites, such as *Coptotermes* or *Nasutitermes,* are found in discrete nest structures and construct mounds. *Porotermes* lives in diffuse nests, usually within one piece of wood. If a colony is somehow broken into one or more subunits, even without reproductives, these subunits are capable of continuing all of the functions of the parent colony. Generally there are five types of individuals in a colony: immatures or larvae, workers, soldiers, reproductives, and nymphs (Miller 1969). Nymphs will eventually metamorphose into adults with wings (alates) that serve to disperse and establish new colonies a significant distance from the natal colony. Colonies contain a large proportion of wingless workers whose role is the care of the immatures and reproductives, whereas the soldiers defend the colony from predators. Workers are the individuals that damage the wood. Flights of the future reproductives (alates) generally occur during summer. In *Porotermes* workers and nymphs are capable of becoming replacement (or supplementary) reproductives and assuming the reproductive role if their subunit is permanently separated from the main colony. It is primarily this capacity for establishing new colonies (by budding) from subcolonies that makes dampwood termites a threat for introduction into non-endemic sites.

*Porotermes adamsoni* lives mainly in hardwood forests, where it forms moderately large colonies in both dead and living trees, as well as in logs. In living trees, colonies begin in scars caused by fire or mechanical damage near the base of tree trunks but may also begin in branch stub holes up to 30 m (98.4 ft) above the ground. Infestation rarely occurs until trees have attained a diameter of 0.3 m (0.98 ft) and never occurs in undamaged living tissue of the tree. Colonies can also be founded in wood in service, particularly when it is damp through contact with soil or through poor ventilation. Colonies initiated in the upper parts of a tree usually remain small, but those that are established at the base of the tree may extend into large roots, through the trunk, and often into the main branches. Commonly the entire diameter of the tree from pith to sapwood is extensively damaged, or the central portion may be completely destroyed and replaced by tightly packed fecal matter excreted over many years. In Tasmania, Victoria, and New South Wales, *P. adamsoni* is considered a significant pest in indigenous forests, especially in older trees (Greaves and others 1965, Greaves 1959, Elliott and Bashford 1984). Trees attacked by *Porotermes* seldom show any outward sign of damage, and there is no evidence of galleries extending from one tree to another. Large colonies in fallen trees frequently contain primary queens, indicating that the reproductives may be very long-lived. Winged adults occur in colonies in the summer (December to early February in Australia). Colonizing flights take place in the early evening; the entire population of winged adults appears to leave at once. Replacement reproductives are commonly produced, especially where gallery systems are very extensive and diffuse.

Several species of dampwood termites are mentioned by Edwards and Mill (1986) as significant pests of wood in buildings, but seldom have they been exported and established in other countries. *Porotermes* has been introduced to New Zealand on at least four occasions in wood other than *Eucalyptus* logs but has not become established (Gay 1969). Similarly, the dampwood termite, *Zootermopsis angusticollis* (Hagen), from the Pacific coastal area of the United States has been introduced to numerous localities throughout the world (Gay 1969), and has now become established on the island of Maui, Hawaii (Woodrow and others 1999, Haverty and others 2000).

**Specific information relating to risk elements**

A. Likelihood of introduction

1. Pest with host-commodity at origin potential:
   Logs—*High* (RC) (Applicable risk criteria, from Ch. 1: a, b, c, d, e, f, g, h)
   Chips—*Low* (MC) (Applicable risk criteria, from Ch. 1: c, d, f, g)

   Just about any of the commercial eucalypt species could supply harborage for dampwood termites. The likelihood of association of dampwood termites with freshly cut logs is greater in natural forests in which silvicultural practices include precommercial thinning and use of prescribed fire. *Porotermes* occurs throughout much of the range of *Eucalyptus, Araucaria, Ceratopetalum, Nothofagus,* or *Pinus* harvested for wood chips. However, the damage done by these termites is easily detected in logs and would result in redirecting logs to a local chip mill rather than being shipped overseas as whole logs. Even though many of the rating criteria apply, termite colonies or subcolonies would not likely survive the chipping process.

2. Entry potential:
   Logs—*High* (RC) (Applicable risk criteria, from Ch. 1: a, b, c)
   Chips—*Low* (RC) (Applicable risk criteria, from Ch. 1: d)

   *Porotermes* has been introduced numerous times into New Zealand but has not yet become established (Bain and Jenkin 1983). Viable colonies of *P. adamsoni* would likely survive the 14-day journey to port cities in the United States, although they should be detectable within the moist cavity in the log by the presence of the packed fecal material. Recently cut logs and the moist fecal material would provide conditions suitable to dampwood termites during transit. The greatest danger exists if items are shipped from plantations in Australia with these species present and remain in storage at the import site in a suitable habitat, such as Hawaii or Puerto Rico, for extended periods of time. Wood chips are highly unlikely to harbor viable groups of termites, because the chips are handled roughly when moved from the home port to the ship and from the ship to the receiving port and then again when transported to the paper mill.

3. Colonization potential: *High* (RC) (Applicable risk criteria, from Ch. 1: b, d, e)

   *P. adamsoni* has not become established elsewhere (Gay 1969). *P. adamsoni* is not restricted by hosts. Even partial colonies can contain many individuals capable of differentiating into a reproductive caste. If a colony contains alates and they were to fly after arriving in the United States, incipient colonies could easily be established. Because these dampwood termites can infest numerous tree species and wood in service, the presence of an acceptable host is not the critical factor. Rather, a suitable environment, with an adequate supply of wood and appropriate temperature and moisture conditions, is the key factor. The initiation of a colony is a slow process, but wood in ground contact, moist wood in structures, and suitable host trees with scars or wounds at ports and storage facilities may provide an infestation site. The adults (alates) fly only about 100 m (328 ft) but are capable of moving up to 1 km (0.62 miles) depending on wind conditions and weather. Long-range [>10 km (>6.2 miles)] establishment of colonies from alates has a very low probability. Colonization potential for *Porotermes* would be greatest under cool, moist conditions.

4. Spread potential: *High* (RC) (Applicable risk criteria, from Ch. 1: b, c, d, e, f, g)

   Termites spread slowly [15 to 300 m (49 to 984 ft) per year], and less than 1% of the alates eventually establish a new colony. However, an important factor concerning dampwood termites is that infested wood or plants in containers with soil, moved by humans in commerce, spreads termites at a much faster rate than their natural spread. Also, once established at the receiving seaport or inland destinations, dampwood termites are often not detected because of their cryptic habits; colonies can be large before the first evidence of their activities is apparent. By this time multiple colonies will already be established adjacent to the invading colony and additional wood or plants could become infested and distributed within the continental United States or its possessions. Furthermore, dampwood termites could be misdiagnosed or confused with endemic species.

B. Consequences of introduction

5. Economic damage potential: *High* (VC) (Applicable risk criteria, from Ch. 1: a, b, c, d, f)

   Dampwood termites will attack untreated wood and live trees. *Porotermes* would not do well in extremely cold climates but could be a problem in moist, warm climates along the western, southern, and southeastern coasts of the continental United States and subtropical and tropical locations of the United States and its protectorates and possessions. They could pose a significant hazard to the numerous eucalypt trees planted as ornamentals, for windbreaks, or for fiber. Control methods for termites are available but can be expensive and could be a risk to environmental quality through increased pesticide use.

6. Environmental damage potential: *Moderate* (MC) (Applicable risk criterion, from Ch. 1: d)

   These termites would not likely cause large outbreaks or kill an excessive number of trees. Trees at greatest risk would be street trees or native trees with a limited distribution, such as Torrey pine (*Pinus torreyana*).

7. Social and political considerations: *High* (RC) (Applicable risk criterion, from Ch. 1: a, c)

   Damage to wood in structures and to fruit or ornamental trees would cause significant concerns, adding to concerns about other exotic termite species.

C. Pest risk potential:
   Logs—*High* (Likelihood of introduction = *High*; Consequences of introduction = *High*)
   Chips—*Low* (Likelihood of introduction = *Low*; Consequences of introduction = *High*)

   Termite colonies or subcolonies would not likely survive the chipping process.

## Selected bibliography

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**Reviewers' comments**—"Entry potential. Is the statement 'Wood chips are not likely to harbor viable groups of termites' supported by references?" (Cameron)

**Response to comments**—The team is not aware of any literature that documents termites in shipments of chips. The statement above was made from empirical observations of the chipping of logs at mills in Australia, the transportation of the chips from the mill to the chip pile, and subsequent transportation to the ship (see trip report). The assumption was made that the chips would be similarly handled from the ship to the port and then to the vehicles that would take them to the paper plant. The statement in question has been modified to reflect these empirical observations.