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BUILDING PRACTICE NOTE

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by

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Wood-frame construction, the predominant building type for homes and small buildings in Canada, is prone to attack by various types of wood-destroying insects. The conditions that cause wood rot in buildings often encourage infestation. This Note provides information to help owners and tenants of wood-frame buildings recognize and control termites and carpenter ants, which are the most destructive of these insects. Some recommendations on good building techniques are also included.

TERMITES

Fossilized remains of termites have been reported in formations 55 million years old. These insects once had a definite place in nature's plan by speeding the recycling of the great timbers of our primeval forests to rich soil by passing the wood through their digestive systems. The long-lived, self-perpetuating colonies have survived on what was once an endless supply of timber. As social insects they are highly co-operative, and because their primary cycle is lived out within the host material they are protected from all but the most severe weather changes.

Termites are most prevalent in the heavily forested coastal areas of the country, especially in the damp and mild coastal climate of British Columbia. However, isolated cases have been reported throughout the country, particularly in south-central British Columbia, southern Ontario, southern Quebec and the Maritimes.

In Canada, almost all instances of termite infestation are associated with areas of rotted wood where the insects find easy access through the soft pulpy material. They are very difficult to control once a colony is established. The insects cannot be easily detected because they feed on the wood from their excavations and, except for the infrequent flights of the reproductives, live entirely within the host material. The emergence of the winged reproductives during the summer months, therefore, may be the first clue to the presence of a colony, unless a wood component has already been weakened to the point of structural failure. When excavating living

quarters, termites produce long flat tunnels that follow the grain of the wood. In this regard the dens are different from those of carpenter ants, which create a random pattern of small dens by cutting across the grain.

General Description

When an infested piece of wood is broken open, it will reveal white or creamy-coloured grubs similar to maggots except that each insect has six legs. The body is divided into three main segments - head, thorax and abdomen. The head has two antennae, composed of many tiny segments, a pair of eyes, and a pair of wood-biting pincers. The chest section (thorax) immediately below the head consists of three segments with a pair of legs attached to each. In the winged variety the insect is dark black or brown, with sets of semi-transparent wings attached to each of the two last segments of this part of the thorax. Termites differ from ants in that their bodies are not constricted where the abdomen joins the thorax. (See Figs. 1 and 2.)

Pacific Dampwood Termite

"The Pacific Dampwood Termite, Zootermopsis angusticollis (Hagen), is most prevalent in the southern lower mainland and Vancouver Island areas, but extends northward in coastal areas to Prince Rupert and the Queen Charlotte Islands...."Pacific Dampwood Termites normally live in coniferous forests in dead trees, stumps or logs which are in contact with the ground or subject to dampness (hence the name 'dampwood'). They prefer material with incipient brown rot or mechanical damage that facilitates entry and subsequent development of a colony. They have been called 'rotten wood' termites. Wood structures in contact with the ground or with a continual source of dampness are equally or more attractive than the natural habitat, often having more suitable temperatures."[1] The winged reproductives emerge in pairs on warm evenings in late July to September to seek out another nesting place for a new colony. This species is illustrated in Fig. 3 (other species are similar).

Western Subterranean Termite

"The Western Subterranean Termite occurs throughout southern British Columbia including Vancouver Island, possibly as far north as Quesnel Lake, but is apparently most prevalent in the interior dry belt from Kamloops south."[1]

The Western Subterranean Termite differs from the Pacific Dampwood Termite in that it is much smaller, although the winged reproductives are similar in form, and there is a worker caste. These termites are subterranean dwellers and prefer to live in the soil, buried wood or

vegetable material from which they usually make tunnels to other food sources in the area, such as wood, cellulose materials and sources of moisture. They build covered passageways where these tunnels emerge from the ground. The tubes, which are constructed with a clay-like earthen material, sometimes lead up and over a foundation to reach wood above ground, such as rotting sills, beams or joists in a poorly designed, moist crawl space of a building. Once they reach these timbers, the termites may then construct other tubes extending back to the soil below. Their excrement may be different from the Pacific Dampwood Termite, with some reports indicating that it is in liquid form and used with earth and wood particles to make a mud-like cement. This material spots the inner walls of their living quarters. These termites may also leave mounds of dark, fine grit near their work areas, which may be sand particles that have accumulated because of the excavation of tunnels through the earth.

After mating, large masses of insects leave the colonies at the same time. These flights usually take place after a heavy rainfall in the spring or late summer so that the resulting softened wood and soil will facilitate the necessary soil or wood boring required for the establishment of new living quarters.

Description (similar to Fig. 3)

Winged reproductives:
- approximately 6 to 10 mm (1/4 to 3/8 in.) in length with small black bodies - 10 mm (3/8 in.) at the reproductive stage;
- wings approximately 8 mm (5/16 in.) long, finely veined, almost transparent, dark grey in colour;
- straight antennae composed of many small segments.

Nymphs:
- soldiers up to 6 mm (1/4 in.) in length with pale yellow heads and small black jaws;
- workers up to 6 mm (1/4 in.) in length, long and slender with pale creamy white appearance.

Eggs:
- similar to those of Pacific Dampwood Termite but only 1 mm (1/32 in.) in length.

Eastern Subterranean Termite

"The Eastern Subterranean Termite is the only species of termite found in Ontario. Although it is widespread, from Ontario south to Florida and west to Arizona and Utah, it is only know to occur in small, widely separated areas in the province....

"Colonies of subterranean termites are usually in the soil, sometimes in damp wood or in wood in contact with the soil. They may be in the soil near a building and their presence remains undetected until termite damage is found or until the winged termites merge from the colony. In Ontario the latter usually occurs, under suitable weather conditions, in spring or early summer and sometimes in the fall, when literally hundreds of yellowish-brown or grey insects about 12 mm (1/2 in.) long leave the colony in swarms."[2]

Except for its smaller size, the Eastern Subterranean Termite would be similar in appearance to those shown in Figures 1 and 3.

Detection of Termites

As mentioned earlier, the winged reproductives may leave the nesting area during the summer evenings to mate and set up a new colony. If they are seen in or around the house in any significant numbers, a thorough search should be made to ensure that a colony has not been established. Locating the nest will be difficult because termites do not leave the telltale powder-like wood particles that are in evidence at the entrance to the dens of other wood-boring insects. The only evidence may be a few very small brown fecal pellets in a crevice in the vicinity of the nest; there may also be sand-like particles in the case of subterranean termites.

Often the insects will be found during renovations and when repairs are made to wood steps or porches, or when there is some kind of structural failure because the wood has been weakened by the colony. To determine the extent of the damage it may be necessary to probe the wood with a sharp instrument such as an ice pick. The wood can also be tapped to see if it produces a hollow sound.

CARPENTER ANTS

Winged adult carpenter ants are sometimes mistaken for termites, and the damage they cause to wooden structures is sometimes confused with that of termites. However, the indications of a colony of carpenter ants are somewhat different. An infestation of carpenter ants is usually associated with soft and deteriorating wood, which is the result of moisture buildup due to poor construction details and

the subsequent development of wood rot. However, the insects have been known to set up colonies in the dark warm spaces of a construction, such as the space between a window frame and the framing for the rough opening, if they can gain entry to these natural hidden cavities. A colony of ants may make a slight rustling sound; if the suspected area is tapped, the rustling sound will usually increase and some adult ants may leave the den.

Carpenter ants do not consume wood but tunnel out areas for nesting. The sawdust-like particles of wood form small piles at the entrance to the dens and may indicate the location of the colony. The appearance of the sawdust piles distinguishes these dens from those of the termite. Carpenter ants may also be detected as they make their way back and forth from the den in search of food.

New colonies may be started each year following the emergence of swarms of winged adults and the ritual of their mating flights. In British Columbia the swarming period usually takes place during May and June.

Description

Adult:
- the literature indicates that glossy black is the predominant colour, but mention is also made of brown carpenter ants and a species where upper part of body (thorax) has reddish tone;
- varies from 6 mm (1/4 in.) to 13 mm (1/2 in.) in length;
- queens can measure up to 25 mm (1 in.) in length.

Pupa:
- creamy-white, many in paper-like, light brown cocoons.

Larva:
- small, creamy-white, legless, maggot-like.

Egg:
- translucent-white, 0.5 mm (1/64 in.) long

Control of Carpenter Ants

The following is reproduced by permission of Agriculture Canada.[3]

CONTROL

An up-to-date edition of this publication is printed every year. These recommendations are for 1979 only.

If possible, replace infested wood with sound material. Otherwise, try to find the nest and treat the area with an insecticide. Use a dust containing 5% chlordane or 5% carbaryl (Sevin^{R}) in a puffer or dust gun. Blow it into cracks and any tunnels that you can find. If you cannot find any opening, drill small holes through which you can blow the dust. Use dust only where children and pets cannot contact dusted surface. For extra control, use an oil-base spray containing 2% chlordane, 0.5% diazinon (Basudin^{R}) or 1% propoxur (Baygon^{R}). Apply it with a paintbrush or garden sprayer along baseboards, under sinks, on connecting pipes, and any other surfaces where ants may travel.

You may see a few ants for several weeks after the treatment as unexposed workers come out of their tunnels in search of food and water. But because residual insecticides are effective for some time, do not repeat the treatment for at least 6 weeks.

Outdoors, apply one of the above insecticides as an emulsion, water suspension, or dust to infested areas, and to foundations and doorsteps. Use the concentration recommended on the label. Do not use household oil-base sprays near vegetation.

CAUTIONS

Follow closely the directions and cautions on the label. Avoid contaminating food. Store insecticides only in properly marked containers and keep them out of the reach of children and pets. If any insecticide gets on your skin, wash it off at once with soap and warm water.

POOR BUILDING TECHNIQUES ENCOURAGE INFESTATION

The same conditions that cause wood rot in a building will increase the risk of insect attack. Therefore the following recommendations should be followed in construction.

1. The site must be well drained especially if a crawl space is planned or if there is to be wood either in contact with the ground or within 600 mm (2 ft.) of the ground.

2. Crawl spaces should be provided with an adequate ground cover to prevent moisture in the ground from evaporating in the space. A ground cover of 4-mil polyethylene weighted down with stone or concrete, is recommended.

3. A means of cross ventilation for all crawl spaces must be provided.

4. Good design will avoid details that create places where water can accumulate in joints. This is especially important where wood steps and porches are exposed to the weather.

5. Wood for the building should be pressure treated with wood preservatives if it is to be used near the ground. This would include sills, beams, joists and subfloor, or any wood within 600 mm (2 ft) of grade.

6. Care should be taken to remove all of the wood materials used for forms in concrete work.

7. Items such as stumps and other wood debris should not be left buried at the site.

8. When wood is to be used for fence posts, the buried portion should be dipped in creosote or other wood preservative.

9. Firewood should not be stored on the ground in the vicinity of the building, nor in basements, because it may contain wood-boring insects.

REGIONAL INFORMATION ON TERMITES AND CARPENTER ANTS

Further information on identification and control of wood-destroying insects should be available from the Federal or Provincial Departments of Agriculture or Forestry. Specimens may be sent to the Entomology departments for positive identification. Ship samples in small plastic containers with tops taped shut. Zoology departments at universities or museums should also be able to help with identification.

These sources deal with current recommendations on poisons used to eradicate the insects. The use of some of the toxic chemicals is controlled by the federal and provincial government, usually on an annual basis.

Addresses

ENTOMOLOGIST
Information Services
Agriculture Canada
Ottawa, Ontario
K1A 0C7

ENTOMOLOGY
Plant Pathology Branch
B.C. Ministry of Agriculture
808 Douglas Street
Victoria, B.C.
V8W 2Z7

RESEARCH STATION
Agriculture Canada
6660 N.W. Marine Drive
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ACKNOWLEDGEMENT

Figures 1 and 2 were prepared by Johann Van Reenen, formerly with Spencer Entomological Museum, Dept. of Zoology, U.B.C., Vancouver, B.C.

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[2] Goble H.W. Powder Post Beetles, Termites and Carpenter Ants. Publication 140, Ontario Department of Agriculture and Food, Toronto, Ont.

[3] Control of Carpenter Ants. PUB 1324, Information Services, Agriculture Canada, Ottawa, Ont. (out of print) The same information may be obtained from PUB 1298 - Control of Ants, Information Services, Agriculture Canada.

FURTHER DOCUMENTATION

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Percival, D.H. Termite Control. Small Homes Council, University of Illinois, Circular F2.5, Vol. 61, No. 19, Oct. 1963.

Termites. B.C. Dept. of Agriculture, Victoria, B.C. Nov. 1972, 5 p.

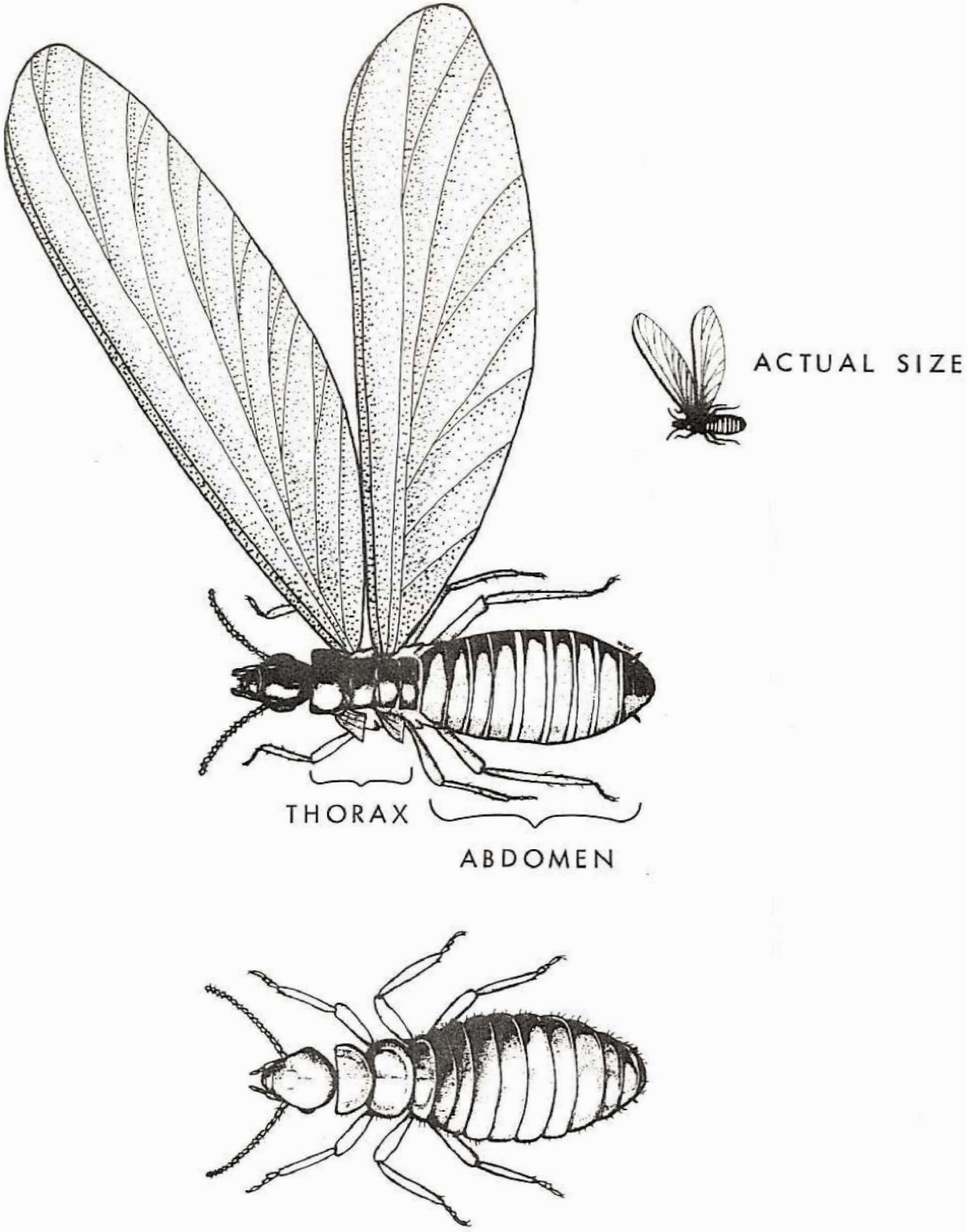

FIGURE 1 TERMITE

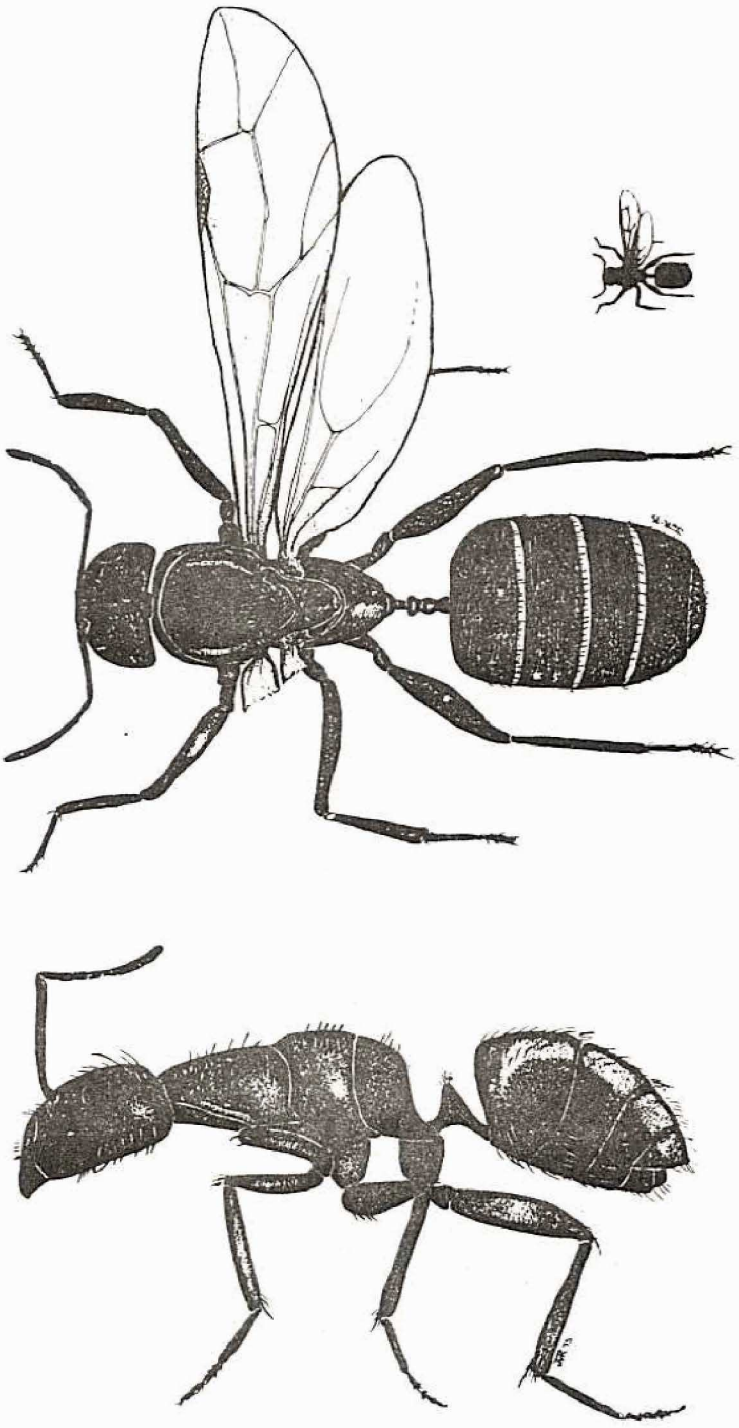

FIGURE 2 CARPENTER ANT

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WINGED REPRODUCTIVES:

- over-all length about 25 mm (1 in.)
- brown bodies with lighter wings
- wings finely multi-veined and much longer than body
- no prominant constructions between head, thorax or abdomen in nymphs or adults
- straight antennae

NYMPHS:

- up to 13 mm (1/2 in.) long, creamy white with yellowish heads
- no worker class and all work is done by these immature reproductives

SOLDIERS:

- up to 19 mm (3/4 in.) long, creamy brown body with large dark brown head, very large almost black jaws

EGGS:

- about 1.3 mm (1/16 in.) long
- ovoid, shiny, silvery or whitish, depending on conditions

FIGURE 3 PACIFIC DAMPWOOD TERMITE