Coptotermes formosanus is a subterranean termite with an affinity for damp places. Wherever there is wood (cellulose) and moisture there is the possibility that this species can inhabit that location.

Species Description
It is difficult to identify Formosan termites with just the workers but the soldiers and alates look different from native subterranean species and are easy to identify. Cabrera et al. (2001) describes the soldiers as follows: “Soldiers have orange-brown, oval-shaped heads that are quite different from the more rectangular, straight-sided head of native subterranean termite soldiers. There is a small pore, called the fontanelle, on the front of the head. The soldiers produce droplets of a white, glue-like fluid from this pore when they are attacked. This fluid gums up and disables attackers. Soldiers have black, sickle-shaped mandibles (jaws) that can be crossed to form an X. The bodies are yellowish-white and are about 6.4mm long. Formosan subterranean termite soldiers are very aggressive. They will even attack fingers or tools if provoked, although their bite and fluid is harmless to humans. Swarmers are yellowish-brown with golden brown heads, a pair of black eyes and 2 pairs of wings of equal length. They are about 12-15mm long from head to wingtip. The wings are clear with two heavily thickened veins on the leading edge and are covered with small hairs. These hairs are clearly visible under magnification.”

Please see PaDIL (Pests and Diseases Image Library) Species Content Page Termites: Formosan subterranean termite for high quality diagnostic and overview images.

Notes
Raloff (2003) reports that, "It can take new colonies at least 7 years to reach a size that creates detectable damage. C. formosanus evaded detection for about 2 decades because they were mistaken for native termites of the Reticulitermes genus."
Lifecycle Stages
Su and Scheffrahn (2000) report that, “A single colony of C. formosanus may produce over 70,000 alates. After a brief flight, alates shed their wings. Females immediately search for nesting sites with males following closely behind. When the pair find a moist crevice with wooden materials, they form the royal chamber and lay approximately 15 to 30 eggs. Within two to four weeks, young termites hatched from the eggs. The reproducitives nurse the first group of young termites until they reach third instar. One to two months later, the queen lay the second batch eggs which would be eventually nursed by termites from the first egg batch. It may take three to five years before a colony reach substantial number to cause severe damage and produce alates.”

Habitat Description
C. formosanus are subterranean and generally live underground. They build nests out of a hard material called carton, workers make carton from soil, chewed wood or plant matter, and their own saliva and faecal matter. Carton nests constructed by hundreds of thousands are large and rock-like. Some Formosan termite colonies build above-ground nests that are not connected to the soil. Nests may be constructed on structures where the temperature does not get too hot or cold and where there is plenty of moisture (Cabrera et al. 2001). Boats and ships; porches, balconies, rooftops with plants; gutters and flat roofs are some of the places where termites find moisture. Cabrera et al. (2001) has found that C. formosanus can take up residence in boats and even high-rise condominiums. Raloff (2003) reports that, "If C. formosanus find reliable food and drink, such as framing timber and rainwater, they will permanently nest within a building's walls." C. formosanus will also reside in live and dead trees along with homes and other man made structures (Raloff, 2003).

Reproduction
After swarming and landing on the ground, the alates break off their wings and search for a mate. Once a mate is found, the male and female search for a crevice in damp ground or wood, hollow out a small chamber, and crawl inside. The pair, now known as the king and queen, mate and within a few days the queen starts laying eggs. The young, known as larvae, hatch from the eggs and are fed by the king and queen. A mature colony contains distinct groups called. These castes look different from one another and each has a special duty within the colony. The king and queen C. formosanus are the primary reproducitives and are responsible for reproduction. If the queen or king dies or the colony becomes large, secondary reproducitives may form and begin reproduction. Soldiers defend the colony against predators and other natural enemies. Workers take care of and feed the larvae, reproducitives and soldiers, tend the eggs, build and maintain the nest, and search for food. Alate nymphs become alates when they are fully grown. (Cabrera et al. 2001).
Nutrition

Cabrera et al. (2001) state that, "Like many other termites, the Formosan termite feeds on wood and other materials that contain cellulose, such as paper and cardboard. Bacteria and other single-celled organisms live in the termite digestive system and digest cellulose providing nutrition and energy for these termites. Although they feed mostly on wood, they will eat other cellulose-containing materials such as cardboard and paper. However, they are known to chew through foam insulation boards, thin lead and copper sheeting, plaster, asphalt, and some plastics." Morales-Ramos and Rojas, (2003) found that, "Colonies of C. formosanus feeding on pecan, Carya illinoiensis (Wangenh.), and red gum, Liquidambar styraciflua L., produced significantly more progeny than colonies feeding on other wood species tested. Progeny of colonies feeding on pecan and American ash, Fraxinus americana L., had significantly greater survival than progeny of colonies feeding on other wood species. Colonies feeding on nutritionally supplemented cellulose based matrix showed similar fitness characteristics as colonies feeding on the best wood treatments. These results indicate that differences observed in colony fitness can be partially explained by nutritional value of the food treatment, raising the possibility that wood from different tree species have different nutritional values to the Formosan subterranean termites. This suggests that feeding preference of C. formosanus is at least partially influenced by the nutritional value of the food source."

General Impacts

C. formosanus will hollow out live trees and not just dead ones. Some colonies will also nest in homes and other structures instead of just dining on them (Raloff, 2003). The presence of C. formosanus can easily go unnoticed for long periods of time. Infestations may not be noticed until floorboards become squishy or visible signs of the colony burrowing out through plaster walls become apparent (Raloff, 2003). Hu and Zhu (2003) found that in the wild C. formosanus cannot hybridise with other termite species. This species is very aggressive and will out compete native species of termites with ease. C. formosanus has its greatest impact in North America. Lax and Osbrink (2003) state that, "C. formosanus is currently one of the most destructive pests in the USA. It is estimated to cost consumers over US $1 billion annually for preventative and remedial treatment and to repair damage caused by this insect." Raloff (2003) states that in North America C. formosanus, "create significantly bigger colonies, and therefore more damage, than do their native U.S. cousins, which reside underground and enter buildings only to forage."

Management Info

Please see Management Information Coptotermes formosanus for management information.

Pathway

Jenkins et al. (2002) state that Coptotermes formosanus spread through commercial traffic in used railroad cross ties.

Principal source: Cabrera et al. 2001. Formosan Subterranean Termite
FULL ACCOUNT FOR: Coptotermes formosanus

GLOBAL INVASIVE SPECIES DATABASE

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Dr. Nan-Yao Su, Ft. Lauderdale Research and Education Center, University of Florida.

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ALIEN RANGE

[1] TAIWAN  [61] UNITED STATES
[1] UNITED STATES MINOR OUTLYING ISLANDS

BIBLIOGRAPHY

46 references found for Coptotermes formosanus

Management information


Summary: Kudzu uses


Summary: A monitoring-baiting technique using hexaflumuron was described to eliminate colonies of the Formosan subterranean termites.


Summary: US and Florida distribution of the Formosan subterranean termite, biology and control.


Summary: The world wide distribution of this termite pest and their control measures are discussed.

Walker, K. 2006. Formosan subterranean termite (Coptotermes formosanus) Pest and Diseases Image Library. Updated on 6/10/2006 10:00:55 AM.

Summary: PaDIL (Pests and Diseases Image Library) is a Commonwealth Government initiative, developed and built by Museum Victoria’s Online Publishing Team, with support provided by DAFF (Department of Agriculture, Fisheries and Forestry) and PHA (Plant Health Australia), a non-profit public company. Project partners also include Museum Victoria, the Western Australian Department of Agriculture and the Queensland University of Technology. The aim of the project is: 1) Production of high quality images showing primarily exotic targeted organisms of plant health concern to Australia. 2) Assist with plant health diagnostics in all areas, from initial to high level. 3) Capacity building for diagnostics in plant health, including linkage developments between training and research organisations. 4) Create and use educational tools for training undergraduates/postgraduates. 5) Engender public awareness about plant health concerns in Australia. PaDIL is available from : http://www.padil.gov.au/aboutOverview.aspx, this page is available from: http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=295 [Accessed 6 October 2006]


General information


FULL ACCOUNT FOR: Coptotermes formosanus


ITIS (Integrated Taxonomic Information System). 2004. Online Database Coptotermes formosanus

Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals. Available from: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=650469 [Accessed December 31 2004]


Summary: The foraging population and territory sizes and the Formosan subterranean termite colonies in urban SE Florida were determined using triple mark-recapture methods.