

## Poster paper

# Status of Asian subterranean termites in the sugarcane belt of Fiji

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**Abstract** Asian subterranean termite, *Coptotermes gestroi* (Wasmann) (AST), has invaded Viti Levu and in late 2009 and early 2010, there was an outbreak mainly in the Lautoka area that caused massive damage to homes and schools. ST is affecting the sugarcane belt areas in Lautoka sectors; Lovu, Lautoka and Drasa. This paper highlights the results of an ongoing survey which is being done through SRIF's routine roging inspection to provide status and margins of the termite zone. Every farm within the affected sectors is being inspected for the presence of AST. All communities from Drasa to Saru including Lautoka City have been declared as biosecurity emergency areas under the *Biosecurity Emergency Promulgation 2010*. The survey result will enable SRIF to closely monitor and modify the certifications of exchange of seed cane within the close localities.

**Key words** Sugarcane, termites, survey, Asian subterranean termites, status, Fiji, Lautoka Mill

The Sugar Industry is the most important primary sector in Fiji, making sugarcane a very important crop. Asian subterranean termite, *Coptotermes gestroi* (Wasmann) (AST), is now infesting sugarcane and is a major concern to the Fiji Sugar Industry. In late 2009 and early 2010, there was an outbreak of AST with the infestation mainly in Lautoka area and causing massive damage to homes and schools. AST is affecting the sugarcane belt areas in Lautoka sectors including Lovu, Lautoka and Drasa. This paper highlights the results of an ongoing survey which is being done through SRIF's routine roging inspection to provide status and margins of the termite zone.

Termites are a social group of insects now placed as a sister group to wood-eating cockroaches. Subterranean termites are considered one of the most economically important pests in the world (Hickin 1971; Pearce 1997; (Su & Scheffrahn 1998). In addition, they are the most destructive and economically important insect pest of wood and other cellulose products (Beal *et al.* 1994) and they are responsible for 80% of all termite damage.

Termites have three specialized castes to perform specific colony functions: workers, soldiers, and reproductives (queens and males). The life cycle starts when the alate sexual adults gather for a single seasonal migration or dispersal flight (Kumar & Frances 1969). The winged forms with long wing-pads are usually present in the colony a few months before the flight. Emergence is related to a series of changes in the activity of the colony (Howse 1970). Soon after reaching maturity, alates (male and female) leave the nest in a swarm and fly up into the air in a nuptial flight (Wheeler 1923).

Once the size of colony reaches a certain point, the reproduction process begins. However, the time which is needed for reaching that level of size to alert the production process varies among different species. In addition, before the alate flight, they congregate away from the main colony and then they leave from holes silted in the ground, mound or wood, or from special flight turrets (Edwards & Mill 1986). Swarms of the reproductive caste may be noticed in infested buildings and trees. These dark-coloured, winged termites are the stage most commonly seen. Winged termites are attracted to light, and when they emerge within buildings, they swarm about doors and windows. After crawling or fluttering about for a short time, the termites break off their wings and locate a mate.

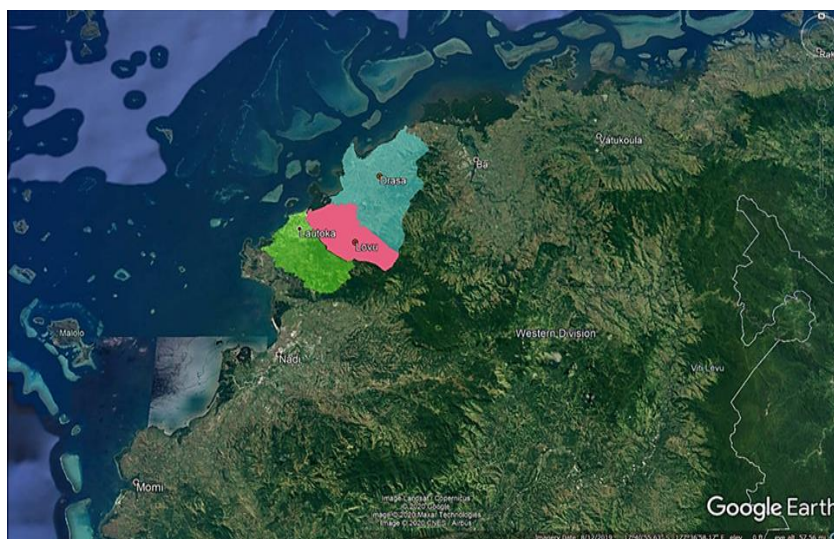
Mating occurs after the male and female have made the first chamber. The female (queen) lays the eggs after a few days or weeks from the pair establishing in their first chamber, after which the incomplete metamorphosis begins. A queen can live for about 20 years and lay 1,000 eggs a day. A colony can have about 60,000 to 1 million termites (Biosecurity Authority of Fiji undated).

Cane infested with termites shows symptoms of yellow and drying of outer leaves from germination to millable canes. Millable canes are tunnelled, the rind remains intact and the centre is filled with moist soil. Damage by AST on sugarcane is approximately 60 cm from the base of the millable stalk. AST dwell in nests and/or trees and gain moisture through mud tubes. The cavity of the colony ranges from 6 m to 7 m deep into the ground to protect termites from extreme weather conditions, thus, termites travel through mud tunnels to reach food. Its biology, aggressiveness and hidden, unpredictable invasiveness make this insect difficult to detect and control.

The current survey is being carried out using SRIF's rouging procedure. This involves:

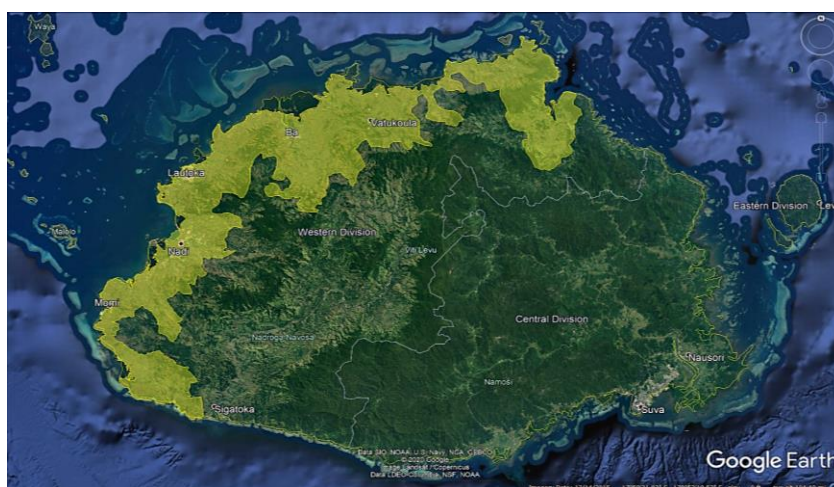
- FRI (four-row inspection) – inspection of four rows at one time
- TRI (two-row inspection) – inspection of two rows
- BRI (border-row inspection) – inspection of just the border of the field because the field has overgrown (lodged, water logged, excess weeds, chemicals applied).

Termites in sugarcane are currently restricted to the Lautoka district, namely Drasa, Lovu and Lautoka (Figure 1), as was observed in a former survey.



**Figure 1.** Infested sectors (source: Google earth pro).

The first survey of termite infestation in the sugarcane fields was carried out jointly with the Biosecurity Authority of Fiji and SRIF in 2014 (Operation Kadivuka). The number of infested farms recorded in that survey was 45 and the number of infested farms declined from 45 to 16 farms in 2018 with the use of bait traps.



**Figure 2.** Sugarcane growing belt (source: Google earth pro).

A second survey was undertaken, beginning from mid-October 2019, in the sugarcane belt of Viti Levu (Figure 2) to determine the status of the spread/ infestation level of AST. About 400 ha were covered over 201 farms has

been surveyed from October 2019 to March 2020. Of these, 13% of farms were infested with 62% of infestations on previously uninfested farms. This highlighted the spread of the termites, although these newly infested farms were in the same locality as the previously infested farms, indicating that spread is within the existing sectors.

SRIF's seedcane sources were also inspected (34.17 ha).

When termites are found, the Biosecurity Authority of Fiji is informed, and baits are laid in the borders of a field or placed in an 'X' pattern depending on the age of the cane. The baits contain liquid Termidor®, active ingredient fipronil. Before the cane field becomes inaccessible, at least at 5 months, all the bait boxes inside the cane are placed on the borders, monitored once a month and cane baits changed when dry. Close to harvest, the bait boxes are removed to avoid damage.

Based on the field inspections and current data it is important to maintain the application of fipronil. The irregular replacement of the bait boxes after field maintenance with implements and harvesting has been determined as one of the reasons for the presence of pre-existing infested fields. The overall survey result will enable Sugar Research Institute to closely monitor and modify the certifications of exchange of seed cane in the close vicinities. A plan is underway for seed cane sources to be established in other areas to cater for clean seed materials in different sectors.

## ACKNOWLEDGEMENTS

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