

Result of Controlling Drywood Termites (*Cryptotermes domesticus* Haviland) by New Method

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Abstract: The efficacy of injecting and liquid termiticide and covering the treatment area with cotton cloth saturated with insecticide for 48 hours was conducted in 2 areas of Tan Da Resort (central Area and Lac Viet area) that were damaged by drywood termite. The results showed that the drywood termite *Cryptotermes domesticus* was completely eliminated 5 days after the injection and covering treatment and there have been no signs of termite activity for 3 months.

Keywords: Drywood Termite, *Cryptotermes domesticus*, Tan Da Resort

1. Introduction

Tan Da Spa Resort (Tan Da Resort) is typical of the ecological zones considered urban area of Hanoi, it is 60 km West of Hanoi city. Tan Da Resort was designed to provide the style of an open, peaceful space and harmonious landscape. The ecological resort area is separated from the residential area. The environmental conditions of the construction area fall in line with the natural environment (wide space, many big trees, etc.) and most of the construction includes materials containing cellulose (wood, bamboo, neohouzeana, palm leaf, etc.), food of many types of termite. The research reported by Trinh Van Hanh et al. (2014) showed that the drywood termite *Cryptotermes domesticus* Haviland was one of the main harmful termite species collected at the Tan Da Resort.

The Management Unit of Tan Da Resort has attempted in the past to limit the destructive ability of drywood termites traditional pesticide surface and injection treatments. However, the efficacy of these treatments did not meet the contract requirements. Termite only “temporarily left” the place of pesticide treated for a short period of time. In front of such a situation, in 2015, the Institute of Ecology and Works Protection researched the application of new method

to treat this harmful termite. The result showed that 3 months after treatment, no termite were found at the locations where they previously appeared.

2. Materials and Methods

2.1. Time of Research

The research is carried out from January to April, 2015 at 27 wooden structural and decorative items on the property of the Tan Da Resort.

2.2. Material

Permethrin 50 EC, Cislin 2.5 EC (deltamethrin, 25g/l), cotton cloth, nylon, adhesive tape, etc.

2.3. Method

- Treating dry wood termite
- + According to the method of Nguyen Quoc Huy et al. (2014).
- + Surveying and marking the position of dry wood termite galleries (based on position of the feces) and determining the quantity of termite fecal before treatment.
- + Injecting a solution of 0.5% Cislin 2.5 EC to saturate the

termite galleries

- + Covering the entire known, infested area with cotton cloth (thickness of 3 mm) saturating it with a 1% Permethrin 50 EC solution.
 - + Covering the cotton cloth with nylon (1mm thickness) for 48 hours.
 - + Using adhesive tape to fix the nylon layer.
 - + Removing treatment materials at treatment locations after 48 hours
 - + Checking the quantity of termite feces at treated and not-treated positions on the 1st, 3rd, 5th, and 7th day after removing the covering material.
 - + Comparing the structural and decorative items treated by only injecting Cislin (not covering) and items not treated.
- Data was processed using Excel 2010.

3. Results

3.1. Actual State of Dry Wood Termite Damage in Tan Da Resort

A total of 42 structural and decorative items were investigated at the Tan Da Resort and 27 were damaged by drywood termites. The damaged items were focused mainly in the Central area of the Resort, including the House on stilts, ancient houses and working room (figure 1). At the affected areas, drywood termite caused damage at 3 main locations within buildings namely the wooden dividing walls in rooms of the ancient houses, wooden pillars and collar beams of the houses on stilts, and the reception house and management house.

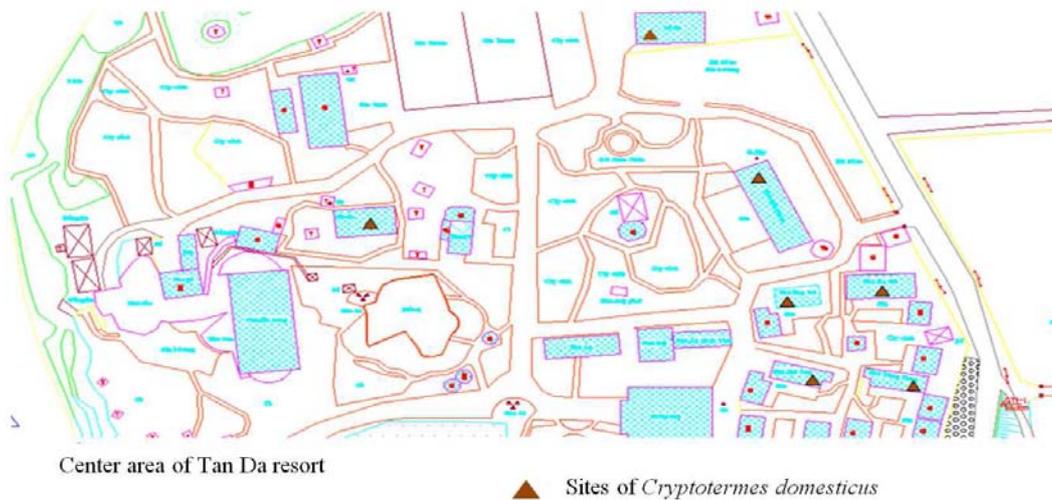


Figure 1. Position of dry wood termite damaging in the Central area of Tan Da Resort.

3.2. Using the Method of Injecting and Covering to Control Drywood Termite

The location of drywood termite infestations was conducted by visual search based on signs of termite feces and marking those positions to arrange testing the treatments.

The test is carried out on 3 different types of wooden

structures damaged by the termite *Cryptotermes domesticus* including: wooden pillars (V1), collar beams (V2) and wooden dividing walls (V3). The test was repeated 3 times for each type of structure for those areas treated with Cislin and not-treated controls.

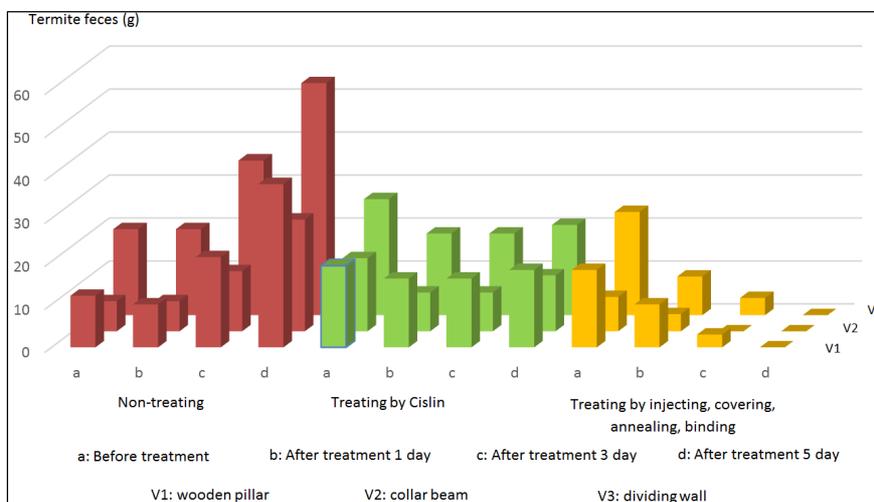


Figure 2. Quantity of termite feces at treatment positions according to the time.

The results in Figure 2 shows that at the time of treatment, the quantity of drywood termite feces discharged at the wooden dividing wall was more than that in 2 other groups in that structure. The quantity of termite feces was the least from the collar beam group at before and after treatment. One day after treatment, the quantity of termite feces at all treatment positions decreased (decreased on average 8.6 g/structural element in comparison to before testing). The quantity of termite feces continued to decrease (on average 14 g/structural element) after 3 days of treatment. Five days after treatment, there were no feces of drywood termite at treatment points. Meanwhile, in comparison, the quantity of feces was slightly reduced but increased gradually after testing. For the measure on injecting Cislin through the knock-out holes, the quantity of discharged feces was reduced in comparison to the periods 1 and 3 days before testing on average, 6.3 g/structural element after treatment. The efficiency of injecting Cislin against the drywood termite was 17.5% after 5 days which indicated that the colony was reduced but not eliminated (Figure 2). Meanwhile the injecting, covering, and binding treatment achieved 100% efficiency after 5 days.



Figure 3. Wing termite and head of worker termite died at position of wooden pillar at house on stilts of Tan Da Resort.

4. Discussion

World-wide, there are many reports on methods for preventing and controlling drywood termite. As demonstrated in numerous studies, fumigation is extremely effective at controlling drywood termites on a whole-structure basis [1], [8]. Although many technologies, such as heat, cold, electricity and microwaves [1], [2] have been developed, chemical treatments are still most commonly used

for control of drywood termite [3]. Vernard et al. (1996) evaluated chemical and non-chemical methods for controlling the drywood termite *Incisitermes minor* (Hagen) and judged that 3 days after treatment 100% control was achieved using steam and 2 fumigants (suluryl fluoride and methyl bromide). According to Lewis (2003), the method of injecting pesticides as local treatments as proposed by Scheffrahn et al. (1997) is easy to apply, economical and popular.

Vernard R. Lewis (2005) evaluated the efficiency of Thiamethoxam 2SC (0.1%) in controlling dry wood termite *Incisitermes minor*. The results showed that the locations treated with Thiamethoxam decreased or eliminated the infestations of the drywood termite *Incisitermes minor*.

In Vietnam, method of treating drywood termite in structural elements and new architecture by applying the solutions in a local treatment method only reduces infestations. The method of injecting, covering, and binding as proposed for the first time according to the basic process of preventing infestations of the beetle *Stromatium longicorne* used by the Vietnam of Institute of Ecology and Works Protection (2014) actually eliminated infestations. Nguyen Quoc Huy et al. (2014) also proposed a similar method to prevent drywood termites at relic areas of Thanh Hoa Province.

The research result from Tan Da Resort is significance by affirming the efficiency of injecting, covering, and binding for controlling drywood termite (*Cryptotermes domesticus*) in Vietnam. Cislin is recommended for use in the treatment of damaging wood due to its penetrating properties in wood components. However, when combined Cislin with Permethrin, the effect is higher than using only Cislin because of the fumigant property of Permethrin. Especially, when using cotton and nylon wrapping after injecting insecticide help to maximize the fumigant property of the Permethrin and increase the effective treatment of termites. This is evidenced by the efficiency of the termite treatment of 100% after 5 days when using the method of injecting, covering, and binding two types of termiticide for treating drywood termite (*Cryptotermes domesticus*) at buildings of Tan Da Resort, compared with 17.5% only injecting Cislin.

Acknowledgements

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