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EVALUATION OF THE LONG TERM EFFICACY OF TERMITIUM® IN PREVENTING THE PENETRATION OF TERMITES THROUGH MORTAR JOINTS.

**ONE STUDY, MANGROVE MOUNTAIN, NSW,
AUSTRALIA, 2008/2009.**

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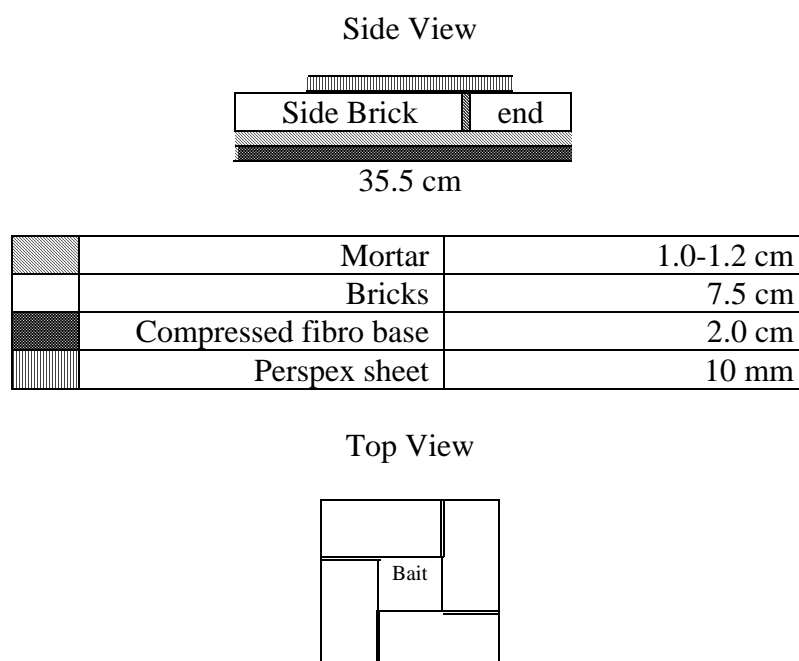
1. SUMMARY

One small plot replicated field trial was conducted during November 2008 to February 2009 to evaluate the efficacy of TERMITIUM® for the prevention of termite penetration through mortar joints over a 3 year period against termites of economic importance in the building industry in Australia. The trial was conducted at Mangrove Mountain in the central coast region of NSW Australia. This report contains the experimental methods used and presents the results obtained for the first 3 months of the trial.

The following treatments were evaluated against *Coptotermes acinaciformis*:

Treatment	Application Rate L/m ² of Brickwork	Application Timing Days After Bricks Laid	Replicates	Code
1. TERMITIUM®	1 L per 2m ² x 2 coats	7-14 days	5	6-10
2. Untreated control	No treatment	NA	5	1-5

The treatments were applied by paint brush to 4 bricks and associated mortar joints for each replicate as shown below:



The Perspex sheet on all replicates of both treatments was fixed in place using Termite Proof Silicone sealant.

The study was set up as a randomised complete block design with five (5) replicates at one level in the soil, 8 cm to 20 cm. Five trenches having dimensions of 134 cm long x 25 cm deep x 45 cm wide were excavated 2 to 3 m out from a tree with a confirmed active healthy termite nest. Each trench was lined with pieces of radiata pine.

At 3 months after installation the treatments were carefully removed from the trenches, with extreme care taken to avoid damaging them.

Individual treatment replicates were assessed for penetration and the timber bait inside the bricks and mortar was assessed for damage by recording the percentage timber consumed by the termites. All mortar joints were assessed and any termite damage to the mortar was recorded.

There was no damage to mortar on any of the TERMITIUM® treated mortar joints.

All the TERMITIUM® treated bricks and mortar were dry compared to the untreated bricks and mortar.

Moisture in the form of condensation under the Perspex in the centre of each of the 5 brick constructions was greater in the untreated constructions compared to the TERMITIUM® treated constructions.

Untreated replicate 2 and replicate 4 had mortar consumed by the termites to a depth of 5-10 mm at one location.

The damage to the radiata timber pieces lining the trenches holding the treatments was significant during the 3 month period of exposure to the natural termite population foraging through the soil. Every piece of lining timber was damaged with greater than 50% of the timber consumed.

The hardness of the bricks and mortar of one untreated and one TERMITIUM® treated construction was tested. Hardness testing was conducted using a scratch test meter (MortarCheck). The treatment of the bricks and mortar with TERMITIUM® increased the level of hardness.

2. INTRODUCTION

One small plot replicated field trial was conducted during November 2008 to February 2009 to evaluate the efficacy of TERMITIUM® for the prevention of termite (*Coptotermes acinaciformis*) penetration through mortar joints over a 3 year period against termites of economic importance in the building industry in Australia. The trial was conducted at Mangrove Mountain in the central coast region of NSW Australia.

This report contains the experimental methods used and presents the results obtained for the first 3 months of the trial.

The trial was conducted under Agrisearch Project ALTERM/08/01.

3. EXPERIMENTAL DETAILS

3.1 Site Details

The following details will be recorded for each field site:

Co-operator Name	Chris Eastwood
Property Name	Eastwood Nurseries
Location	Mangrove Mountain NSW Australia
Termite Genus and Species	<i>Coptotermes acinaciformis</i>
Nest Situation	Tree
Soil Type	Brown sandy loam
Site History	Bushland
Activities in 100 m radius	Sheds, home, shade houses, tanks, dog kennels
Start Date	Treated bricks and mortar on 23 October 2008, installed into ground on 12 November 2008

3.2 Treatment List

The following treatments were evaluated against *Coptotermes acinaciformis*:

Treatment	Dilution Rate per mL/100 L	Application Rate L/m ² of Brickwork	Application Timing Days After Bricks Laid	Replicates	Code
1. TERMITIUM®	NIL	1 L per 2m ² x 2 coats	7-14 days	5	6-10
2. Untreated control	NA	No treatment	NA	5	1-5

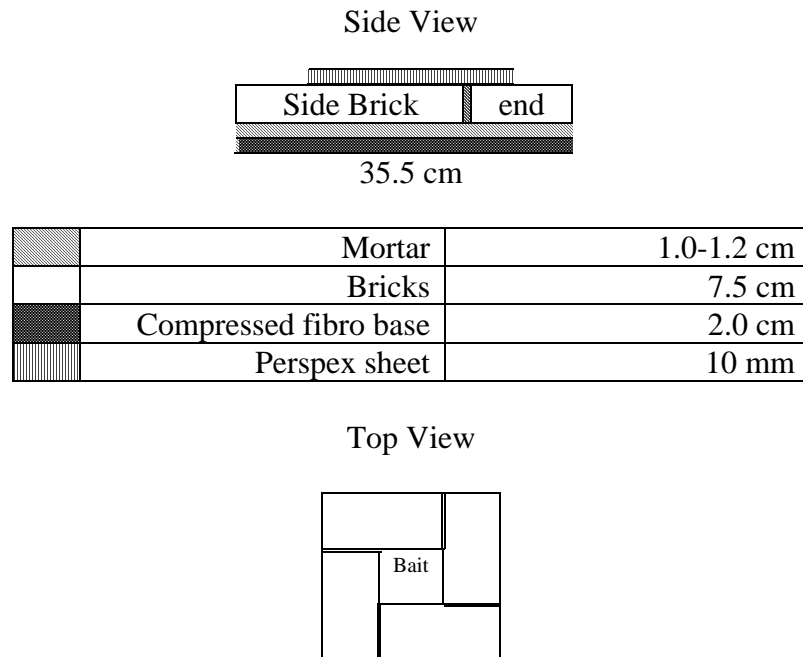
3.3 Formulations

TERMITIUM® – a single part formulation containing Styrene Acrylate Polymer and Siloxane Hydrocarbon Solvent as marketed by Alterm National Pty Limited. The Batch Number was 1A2/21.2/35/06/AUS20350 with a Date of Manufacture of 30/04/07.

3.4 Treatment Method

The treatments were applied by paint brush to 4 bricks and associated mortar joints as shown in figure 1 below:

Figure 1:



The Perspex sheet on all replicates of both treatments was fixed in place using Termite Proof Silicone sealant, grey in colour and Lot# 0005171069 and a use by date of Aug 2009.

3.5 Application Details

Date	Time of Day	Temperature	Relative Humidity	Cloud Cover	Wind
23 Oct 08	1505-1630	16.5°C	57%	Indoors	Indoors

3.6 Trial Design

The study was set up as a randomised complete block design with five (5) replicates at one level in the soil, 8 cm to 20 cm. A trench having dimensions of 134 cm long x 25 cm deep x 45 cm wide was excavated 2 to 3 m out from a tree with a confirmed active healthy termite nest. Five lengths of trench were prepared to house the 2 treatments x 5 replicates and they were positioned equidistant around the nest.

Each treatment replicate was 35.5 cm long x 35.5 cm wide x approximately 12 cm deep as shown in Figure 1. A 20 cm spacing was left between each replicate as well as at the ends, therefore, each length of trench was 134 cm long. The 25 cm deep x 45 cm wide trench was lined with pieces of radiata pine having dimensions of, 40 cm long x 1.9 cm deep x 4.2 cm wide. The gap between each piece of timber was around 0.5 cm so that termites could travel easily through it. A length of soaker hose was placed in the base of the trench under the timber lining for the entire length of the trench.

The end of the soaker hose in the trench was sealed and the other end was positioned above the trench so that it could be fitted to a 20L plastic drum of water. Trenches were watered if there was a continuous dry period of 8 weeks.

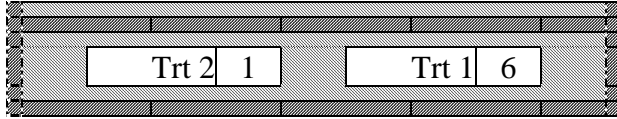
A layer of soil approximately 3 cm deep was placed over the timber lining in the base of the trench and then the treatment replicates were placed on top of the soil, 20 cm apart and 20 cm from each end and 5 cm from each side. Soil was placed into the trench until it covered the block of replicates with approximately 3 cm of soil. Then another layer of radiata pine timber was placed over the top of the soil and another 2-3 cm of soil was placed over the layer of timber to bring it to ground level.

The soil was dampened after it was added to the trench each time using a new watering can and new 20L plastic drums containing potable tap water.

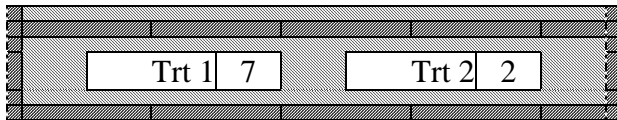
A plastic sheet was placed over each completed block of treatments to help retain moisture. The plastic sheet was completely covered with soil to secure it.

Figure 2:

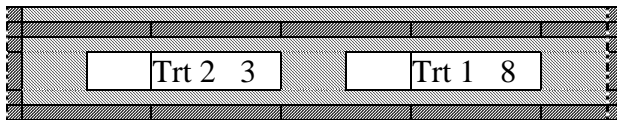
Block 1 – Replicate 1 – Side view



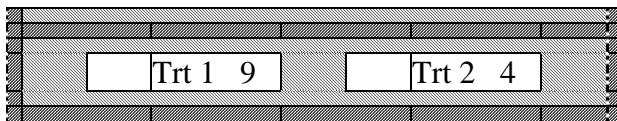
Block 2 – Replicate 2 – Side view



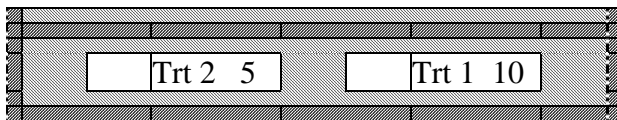
Block 3 – Replicate 3 – Side view



Block 4 – Replicate 4 – Side view



Block 5 – Replicate 5 – Side view



	Soil
	Timber
	Treated bricks and mortar

3.7 Assessments

3.7.1 Efficacy

Efficacy was assessed at 3 months after installation. The treatments were carefully removed from the trenches, with extreme care taken to avoid damaging them. Individual treatment replicates were assessed for penetration and the timber bait inside the bricks and mortar was assessed for damage by recording the percentage timber consumed by the termites. All mortar joints were assessed and any termite damage to the mortar was recorded.

Penetrated and damaged untreated replicates had the timber bait replaced, while any penetrated and damaged TERMITIUM® treatments were not replaced.

Pieces of radiata pine timber lining damaged by termites was recorded and replaced.

The trenches were re-installed with the same treatment randomised complete block design as at the start of the study and the same radiata timber lining and soil was re-installed as it was at the start of the study.

3.7.2 Hardness of Bricks and Mortar

On the day of the 3 month assessment the hardness of the bricks and mortar of one untreated and one TERMITIUM® treated construction was tested. Hardness testing was conducted using a scratch test meter (MortarCheck). Three replications were tested on both the bricks and mortar for each of the treatments.

3.8 Statistical Analysis

Statistical analyses were not required at this assessment due to no bait damage.

4. RESULTS AND DISCUSSION

Results are summarised in Tables 1 to 3 and are given fully in the appendices.

4.1 Bait, Mortar and Brick Assessment

Table 1 Agrisearch Services Pty Ltd – Summary of Results
Bait, Mortar and Brick Assessment Records

TRT	REP	Code	Termites in Bait	% Bait Damaged	Shelter Tube on Mortar	Mortar Damaged	Shelter Tube on Bricks
1 TERMITIUM®	1	6	No	0	No	No	No
	2	7	No	0	No	No	Yes
	3	8	No	0	Yes	No	Yes
	4	9	No	0	Yes	No	Yes
	5	10	No	0	Yes	No	Yes
2 Untreated	1	1	No	0	Yes	No	Yes
	2	2	No	0	Yes	Yes	Yes
	3	3	No	0	Yes	No	Yes
	4	4	No	0	Yes	Yes	Yes
	5	5	No	0	Yes	No	Yes

There was no damage to mortar on any of the TERMITIUM® treated mortar joints.

All the TERMITIUM® treated bricks and mortar were dry compared to the untreated bricks and mortar and there was significantly less moisture under the Perspex in the centre of each of the 5 brick constructions.

Untreated replicate 2 had mortar eaten on one bottom corner to a depth of approximately 1 cm. Untreated replicate 4 had a 5 mm deep x 3 mm diameter hole eaten into the mortar under a large shelter tube on the side of the brick construction.

4.2 Timber Lining Assessment

Table 2 Agrisearch Services Pty Ltd – Summary of Results
Timber Lining Assessment Records

TRT	REP	Code	No. Timber Top Damaged	No. Timber Base Damaged	No. Timber Ends Damaged
1 TERMITIUM®	1	6	26/26	26/26	8/8
	2	7	26/26	27/27	8/8
	3	8	25/25	25/25	8/8
	4	9	22/22	25/25	8/8
	5	10	25/25	25/25	8/8
2 Untreated	1	1	26/26	26/26	8/8
	2	2	26/26	27/27	8/8
	3	3	25/25	25/25	8/8
	4	4	22/22	25/25	8/8
	5	5	25/25	25/25	8/8

The damage to the radiata timber pieces lining the trenches holding the treatments was significant during the 3 month period of exposure to the natural termite population foraging through the soil. Every piece of lining timber was damaged with greater than 50% of the timber consumed.

4.3 Hardness of Bricks and Mortar

Table 3 Agrisearch Services Pty Ltd – Summary of Results
Hardness Assessment Records for Bricks and Mortar

TRT	REP	Code	Rep	Mortar (in/mm)	Brick (in/mm)
1 TERMITIUM®	1	6	1	0.001/ 0.03	0.002/ 0.05
			2	0.002/ 0.05	0.001/ 0.03
			3	0.002/ 0.05	0.001/ 0.03
			Mean	0.0017/ 0.043	0.0013/ 0.036
2 Untreated	1	1	Rep	Mortar (in/mm)	Brick (in/mm)
			1	0.010/ 0.25	0.015/ 0.38
			2	0.004/ 0.10	0.012/ 0.30
			3	0.003/ 0.08	0.006/ 0.15
			Mean	0.0057/ 0.143	0.011/ 0.276

The treatment of the bricks and mortar with TERMITIUM® increased the level of hardness from M3 Mortar (0.143) to an M4 Mortar (0.043), as the lower the reading the harder the surface.

5. CONCLUSIONS

There was no damage to mortar on any of the TERMITIUM® treated mortar joints.

All the TERMITIUM® treated bricks and mortar were dry compared to the untreated bricks and mortar.

Moisture in the form of condensation under the Perspex in the centre of each of the 5 brick constructions was greater in the untreated constructions compared to the TERMITIUM® treated constructions.

Untreated replicate 2 and replicate 4 had mortar consumed by the termites to a depth of 5-10 mm at one location.

The damage to the radiata timber pieces lining the trenches holding the treatments was significant during the 3 month period of exposure to the natural termite population foraging through the soil. Every piece of lining timber was damaged with greater than 50% of the timber consumed.

The treatment of the bricks and mortar with TERMITIUM® increased the level of hardness.