

PRODUCT PERFORMANCE / EFFICACY REVIEW

Mark Suarez, Entomologist - IB

Mark Suarez
18 June 2007

DATE: 18 June 2006

EPA REG. NUMBER: 64405-1

PRODUCT NAME: BoraCare

REGISTRANT: Nisus Corp.

PM: Richard Gebken, PM 10

REVIEWER: Pat Quarles

DECISION #: 373394

DP BARCODE: 335351

ACTION: R34/305

ACTIVE INGREDIENT(S): 011103, Boron Sodium Oxide;
tetrahydrate.....40.0%

TYPE: Wood Treatment

OPPTS GUIDELINE(S): 810.1000
810.3000
810.3600

MRID: 46753001
46753002
46753003
46753004
46753005
46753006
47020601
47020602
47020603

GLP ?: No.

SITES: Structural Wood Components

PESTS: Wood Destroying Insects

STUDY APPLICATION RATE: See Individual Study Summaries.

LABEL APPLICATION RATE:

STUDY SUMMARIES:

MRID 46753001. Smith, W.; Voinot, D.; Kanazawa, F.; et. al. (2003) Investigation of Bora-Care Resistance to Formosan Subterranean Termite Tubing Over Concrete. Unpublished study prepared by Louisiana State University. 13 p.

A laboratory trial was developed to evaluate the effectiveness of surface spraying concrete with BoraCare (0.0710 g/cm^2) for preventing termites from tunneling over the surface. Concrete strips were treated and placed into sand filled bases with Formosan termites, *Coptotermes formosanus*, and water. A piece of wood was placed on the top of the cement strip (23" above sand) as a food source. The colony was observed over 30 days. In replicates ($n=5$) treated with BoraCare, termites failed to reach the bait wood, had stopped tunneling by day 10, and had a high incidence of mortality (93%). In controls, termites were observed to reach and damage the wood within 6 days (all reach the bait by day 22), caused a 44% reduction in the weight of the wood, and had reduced mortality (36%).

The data are not adequate to support claims for application to concrete. In order for claims to be supported, the treatment would need to be shown to be effect for much longer under field conditions – at least under simulated field conditions.

MRID 46753002. Amburgey, T.; Barnes, H.; Parikh, S. (2004) Testing the Decay Resistance of Nisus Formulations: Bora-Care. Unpublished study prepared by Mississippi Forest Products Laboratory. 26 p.

Trials involved the treatment of cubes of Southern yellow Pine (SYP) or sweetgum (SWG) sapwood treated with BoraCare per AWPA E10-01 at dilutions of 1:3, 1:5, 1:10, and 1:20. These blocks were then exposed to brown rot (SYP) or white rot (SWG) fungi. Other formulations were also tested for comparative purposes. Fungal decay measured as mean % weight loss was reported.

The % weight loss reported was positively correlated with % concentration of BoraCare ($r^2_{BR} = 0.97$; $r r^2_{BR} = 0.95$).

No termite data were generated in this study.

MRID 46753003. Amburgey, T.; Sanders, M.; Lindsey, G. (2005) Field Test with BoraCare-Treated Wall Panels - Second Annual Inspection. Unpublished study prepared by Mississippi Forest Products Laboratory. 9 p.

Field trial with 4 treatments were conducted (1 untreated control; 1:1 ratio Boracare:Water applied as per DFU; Framing treated, except top plate, both sides of OSB sheathing; 1:1 ratio Boracare:Water applied as per DFU; Framing treated, except top plate, both sides of OSB sheathing, gypsum board installed on inner side; 1:1 ratio Boracare:Water applied as per DFU (applied 2X); Framing treated, except top plate, both sides of OSB sheathing). Boxes were constructed from simulated walls (22.5" tall and 3' wide). In each wall panel, three of the studs were SYP, the fourth hem-fir, and the fifth Douglass fir. Each structure had 4 walls. For every box,

each wall received a different treatment. The wooden boxes were placed onto cinderblock "foundations" with each side having a "feeder stake" contacting the ground the bottom of the sill plate to provide termite access. The interiors of the structures were covered with gypsum board, the exterior of the structures were sided with OSB and fiberglass and roofed fiberglass. Twelve structures were constructed as described above. In addition, two structures built and left completely untreated. The structures were left in the field for an unspecified amount of time.

No appreciable differenced between treatments was observed. Although the baits stakes showed evidence of termite activity in nearly all instances, only one side of a completely untreated control structure showed termite activity.

Due to lack of termite pressure on the structures, the data were not informative.

MRID 46753004. Amburgey, T.; Barnes, H.; Parikh, S. (2005) Testing the Termite Resistance of Nisus Formulations: Bora-Care. Unpublished study prepared by Mississippi Forest Products Laboratory. 13 p.

Wafers of SYP sapwood were left untreated (control) or treated with varying concentrations of Bora Care (50, 25, 16.67, or 9.09%) or CCA (0.6, 0.12, or 0.025%) and exposed to termites (*R. flavipes* & *C. formosanus*) in the lab for 4 weeks according to AWWA Standard E10-01. The amount of damage (ASTM rating) and mean % weight loss were reported. Damage rating decreased with increasing treatment concentration. The percent weight loss increased with increased treatment concentration, but treated wood blocks not exposed to termites exhibited similar results. Tunneling and slight damage was not prohibited, but mortality of exposed termites was notable within 1 week for *R. flavipes*. For *C. formosanus*, the amount mean % weight loss was noticeable at 4 weeks; however, the damage reported was greatly reduced. Mortality was also higher in the treatment groups.

MRID 46753005. (Anonymous) (2005) Commercial Efficacy Report to Support Bora-Care Treated Wood as an Effective Stand-Alone Pretreatment for the Control of Termites. Unpublished study prepared by Nisus Corp. 16 p.

Data from 32 Terminix properties in southern Alabama treated with BoraCare (1:1 dilution) were submitted in support of the efficacy of BoraCare under actual use conditions. Five of the 32 homes were dropped from the study for varying reasons ($n_{\text{effective}}=27$). Included in the homes excluded were 2 that required remedial soil applied termiticide treatments. Of the remaining homes, only 5 had termite activity (defined as tubing on non-cellulosic slabs or foundations) on the property and only 1 of those had activity at the structure.

The single data point that could be used to validate the effectiveness of BoraCare in preventing infestation of a treated structure when termite activity was verified at the structure was reported as a product failure.

MRID 46753006. Williams, L.; Amburgey, T. (2006) Barriers of Glycol/Borate Treated Wood Prevent Termite Attack to Untreated Wood Above Them in 10-yr Field Tests. Project Number: EC/03/198. Unpublished study prepared by Mississippi Forest Products Laboratory. 19 p.

A 10 year field trial designed to evaluate the efficaciousness of BoraCare (1:1 and 1:6 dilutions) against termites (*R. flavipes*) was conducted in Mississippi.

Floor Joist Units

Five replicates for each treatment of simulated crawl space trials with span and header joists on half buried cinder blocks were constructed at each of 3 USFS plots in Gulfport, MS. Distribution of the treatment and control units was according to the completely randomized design. The span joists were treated once on each side, while the header joists were treated twice on the inside surface only. Untreated pine sapwood was placed on top of each unit. The units were covered with painted plywood boxes to provide protection from the elements.

The data indicate that through the 10 year field study, the product is efficacious are a pretreatment, as applied in the trial (See Table 1 from MRID 46753006). Only one failure was reported for the 1:1 dilution.

Tubing units

Replicates of each of three treatments (1:1 & 1:6 BoraCare:water and water control) were constructed to test the effectiveness of simulated wall studs. A 610 mm long piece of southern pine (treated or untreated) was placed just above the ground with a piece of untreated pine on top of it. PVC tubes housed the wood pieces. Termite activity in the plots was verified with monitoring stakes placed adjacent to the PVC tubes.

Over the 10 year trial, only one tube (out of 15) treated with 1:1 BoraCare had any tubing (250 mm). In the 1:6 BoraCare treatment, 7/9 units had tunneling (100 to 460mm) in years 1-5 and one 250mm tube in year 7. Termites did not reach the untreated wood in BoraCare treatments. In the water controls, 9/15 unit had tubing in years 1-5, in years 6, 7, and 9 controls had tubing ranging from 100 to 610 mm on 3, 4, and 2 units, respectively.

Table 1. Joist test. Mean stake ratings for termite attack by plot, treatment and incidence percentages for termites beneath test units for yrs 1997-2001 and for attack of untreated wood above units during 10 test yrs.

Treatment/ Type of wood ^a	Mean monitor stake ratings ^b					Percent incidence of termites in soil beneath test units ^c	Percent incidence of termite attack to untreated wood above units ^d
	1997	1998	1999	2000	2001		
Plot A							
Treated/old	3.6	3.3	4.7	3.3	2.0	96	0
Control/old	4.1	4.7	5.1	4.8	6.9	72	22
Treated/new	3.1	4.5	4.0	3.7	2.5	84	2
Control/new	2.9	4.4	2.5	2.4	2.4	88	12
Plot B							
Treated/old	7.0	8.1	8.5	6.2	5.4	72	0
Control/old	5.3	7.0	8.0	7.8	4.8	92	18
Treated/new	5.2	7.3	6.8	5.6	4.9	84	0 ^e
Control/new	7.6	7.6	7.6	5.4	6.9	72	12
Plot C							
Treated/old	4.9	6.9	5.8	4.3	7.8	80	0
Control/old	4.8	6.2	5.3	7.0	2.9	84	14
Treated/new	3.3	6.8	5.9	1.1	6.7	84	0 ^e
Control/new	8.2	5.4	3.9	3.4	6.9	96	8

All treated wood was sprayed to the point of runoff with a 1:1 dilution of Bora-Care #; span joist pieces were treated once on each side and header joists twice on the inside only.

^bEach entry represents the avg of 10 replicates. Rating scale (AWPA Standard E7-93) ranges from 0-complete failure to 10-no attack.

^cAs verified by termite damage to one or both monitor stakes within a test unit for 5 test units per treatment for each of 5 yrs calculated as a percentage of 25 chances for termites to have been present.

^dEach entry represents percentage of times for 50 replicates or chances that wood above 5 test units was attacked during 10 yrs; units themselves may have been attacked at much higher percentages.

^eTermites reached untreated wood above one unit by tunneling through monitoring stake.

MDIR 47020601. Jonovich, J. (2006) Efficacy of Bora-Care as a Remedial Drywood Termite Treatment in Residential Structures. Project Number: FCDT001. Unpublished study prepared by Horticare Pest Management. 42 p.

The data submitted in MRID 47020601 were collected during a field trial in which BoraCare was tested as a remedial drywood termite, *Cryptotermes brevis*, dry foam treatment at a rate of 1:1 or 1:5 BoraCare:water. Five residential structures with active infestations were identified. A total of 11 sites were identified to have

drywood infestations within the 5 structures. All sites within a structure were treated at the same rate. Three structures with a total of 7 infestations sites were treated at the lower 1:5 rate, while 2 structures with a total of 4 infestation sites were treated at the higher 1:1 rate. Infestation sites were treated and inspected monthly for 3 months to verify the presence or absence of termites post-treatment.

No termite activity was noticed at the treated sites during any of the three follow-up inspections at any of the structures.

MRID 47020602. Austin, J.; Gold, R. (2006) Efficacy of Bora-Care for Remedial Control of the Light Southern Drywood Termite, *Incisitermes snyderi*. Project Number: TAM/DT/001. Unpublished study prepared by Texas A & M University. 25 p.

Data were provided in support of use of the product against the Light Southern drywood termites, *Incisitermes snyderi*. Laboratory and field data were conducted with a 1:1 and 1:5 dilution of BaraCare:water. In both trials, five treatments were used 1:1 topical application, 1:5 topical application, 1:5 injection and topical application, a water control, and an untreated control. Five replicates were run for each treatment. In lab trials, board infested with *I. snyderi* were collected brought into the lab and treated; in field trials, infested floor boards inside a warehouse were treated in place. The treated sites were examined 30 and 90 days after treatment.

In both laboratory and field trials, the author reported that 1:1 and 1:5 combined injection and topical application resulted in 100% mortality. This was reportedly further verified in the laboratory trials where the infested lumber was destructively sampled confirming the absence of live termites. However, the Termitrac data reported fail to confirm this assessment. These data are inconclusive, at best.

MRID 47020603. Taylor, R.; Lewis, V. (2006) Laboratory and Field Efficacy Trials for Several Bora-Care Dilution Rates and Application Techniques for Remedial Control of Drywood Termites. Project Number: UCDT001. Unpublished study prepared by University of California. 23 p.

Data were submitted in support of use of the product against the drywood termites, *Incisitermes minor*. Laboratory and field data were conducted with a 1:1 and 1:5 dilution of BaraCare:water. In both trials, five treatments were used 1:1 topical application, 1:1 injection, 1:1 topical application and injection, 1:5 injection and topical application, and an untreated control. Three replicates were run for each treatment. The amount of termite activity was measured using an AED (acoustic emission device) 1 and 7 DAT and 1, 2, and 3 MAT. The results were not fully conclusive. Data from destructive sampling was not yet available.

ENTOMOLOGIST'S COMMENTS AND RECOMMENDATIONS:

The data provided attempt to address two main issues, the use of BoraCare as a structural pretreatment against subterranean termites and a remedial treatment against drywood termites.

The data provided in support of the use of BoraCare as a structural pretreatment are varied. Only MRIDs 46753005 and 46753006 are germane to this discussion. The data provided in the Terminix study are not adequate to support such a claim due to the fact that only one structure showed evidence of termite active in the structure itself. In that instance, the product was reported as a failure due to infestation of the home. The other homes are not valid data points because the integrity of the borate "barrier" was never actually tested. In the case of the Gulfport studies, the joist tests appear to strongly support the efficaciousness of the product against subterranean termites under simulated field conditions. However, the tubing unit data supported only the 1:1 rate.

The drywood termite field data are generally inconclusive. However, the laboratory trials that have been completed generally support foam injection application of 1:1 Boracare:water. This use may be added to the label.

Recommendations:

1. In their whole, the data provided are adequate to support a structural pretreatment claim against subterranean termites (*Reticulitermes* spp. only)
 - a. The registrant may remove the following disclaimer sentence: "BoraCare is not intended as a substitute for mechanical alteration, soil treatment, or foundation treatment."
 - The registrant may not add a claim that it is a substitute for a soil applied liquid termiticide claim.
 - b. The product must be applied at a dilution ratio of 1:1 BoraCare:water
 - c. The product must be applied to the point of run-off
 - d. The product must only be used as a structural pretreatment against termites on wood protected from the elements
 - e. Two applications to sill plates and other lumber in contact with the foundation are mandatory. The first application must be completely dry before the second application,
 - f. Treated lumber must not be in contact with the soil or a moisture source.
2. Claims against drywood termites may be added to the label, at a dilution ratio of 1:1 and only with directions for drill and injection treatment.
 - a. No topical treatment is supported.
 - b. No ratio of less than 1:1 BoraCare:Water is supported.

Enclosure
064405-00001 5803459-1R