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:


A laboratory trial was developed to evaluate the effectiveness of surface spraying concrete with BoraCare (0.0710 g/cm²) 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.


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 ($r^2_{BR} = 0.97; r^2_{BR} = 0.95$).

No termite data were generated in this study.


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 differences 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.


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 AWPA 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.


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_effective=27). Included in the homes excluded were 2 that required remedial soil applied termicide 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.
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. Joint 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.

<table>
<thead>
<tr>
<th>Treatment/ Type of wood</th>
<th>Mean monitor stake ratings(b) 1997 1998 1999 2000 2001</th>
<th>Percent incidence of termites in soil beneath test units(c)</th>
<th>Percent incidence of termite attack to untreated wood above units(d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plots A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treated/old</td>
<td>3.6 3.3 4.7 3.3 2.0</td>
<td>96</td>
<td>0</td>
</tr>
<tr>
<td>Control/old</td>
<td>4.1 4.7 5.1 4.8 6.9</td>
<td>72</td>
<td>22</td>
</tr>
<tr>
<td>Treated/new</td>
<td>3.1 4.5 4.0 3.7 2.5</td>
<td>84</td>
<td>2</td>
</tr>
<tr>
<td>Control/new</td>
<td>2.9 4.4 2.3 2.4 2.4</td>
<td>88</td>
<td>12</td>
</tr>
<tr>
<td>Plots B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treated/old</td>
<td>7.0 8.1 8.5 6.2 5.4</td>
<td>72</td>
<td>0</td>
</tr>
<tr>
<td>Control/old</td>
<td>5.5 7.0 8.0 7.8 4.8</td>
<td>92</td>
<td>18</td>
</tr>
<tr>
<td>Treated/new</td>
<td>5.2 7.3 6.8 5.6 4.9</td>
<td>84</td>
<td>0(e)</td>
</tr>
<tr>
<td>Control/new</td>
<td>7.6 7.6 7.6 5.4 6.9</td>
<td>72</td>
<td>12</td>
</tr>
<tr>
<td>Plots C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treated/old</td>
<td>4.0 6.9 5.8 4.3 7.8</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Control/old</td>
<td>4.8 6.2 5.3 7.0 2.9</td>
<td>84</td>
<td>14</td>
</tr>
<tr>
<td>Treated/new</td>
<td>3.3 6.8 5.9 1.1 6.7</td>
<td>84</td>
<td>0(e)</td>
</tr>
<tr>
<td>Control/new</td>
<td>8.2 5.4 3.9 3.4 6.0</td>
<td>96</td>
<td>8</td>
</tr>
</tbody>
</table>

\(a\) All treated wood was sprayed to the point of run off with a 1:1 dilution of Bora-Care \& a spray joint was treated once on each side and heater joint twice on the inside only.

\(b\) Each entry represents the avg of 10 replicates. Rating scale (AWPA Standard E-4) ranges from 0-complete failure to 10-no attack.

\(c\) As 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 studied as a percentage of 25 chances for termites to have been present.

\(d\) Each entry represents percentage of times for 20 replicates or chances that wood above 5 test units was attacked during 10 yrs. units themselves may have been attacked at much higher percentages.

\(e\) Termites reached untreated wood above one unit by tunneling through monitoring stake.


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.


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 Termotrac data reported fail to confirm this assessment. These data are inconclusive, at best.


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 it 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.