# IMPACT OF AUXILIARY STATIONS IN A BAITING PROGRAM FOR SUBTERRANEAN TERMITES (ISOPTERA: RHINOTERMITIDAE)

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Termite baiting programs rely on proper placement of monitoring stations to establish feeding sites for termite workers. To successfully suppress or eliminate a colony, termites must remain at baited sites long enough to transfer the toxicant from the station to cohorts. Other studies have reported on proper placement of stations to increase the probability of termite attacks and to reduce the time required for termites to initially locate monitoring stations (Henderson et al. 1998; Jones 2003). Henderson et al. (1998) reported that termites attack monitors twice as often when placed in conducive locations rather than in a random pattern. Jones (2003) reported an average 38-day decrease in time to termite attack when monitoring stations were targeted rather than random.

To increase the probability of termites continuing to feed at a baited site and deliver more bait to the colony, the label recommends the installation of one or more auxiliary stations 30 cm from the original baited station when the Sentricon® *Termite Colony Elimination System* and Recruit™ III bait (Dow AgroSciences, Indianapolis, IN) is used. While the strategy appears reasonable, no research has been published to confirm the merit of the assumption. The purpose of our study was to investigate the benefits of auxiliary stations in a *Reticulitermes* spp. termite baiting program. Specifically, we wanted to determine whether (1) auxiliary stations are more likely to be found by termites than stand-alone stations, (2) the use of auxiliary stations improves our ability to retain termite foraging in active stations over time, and (3) the use of auxiliary stations increases the total consumption of bait matrix.

We monitored eight homes in upstate South Carolina with newly-installed Sentricon Systems for approximately one year. Stations were placed around the perimeter of buildings three meters apart. A total of 183 stations were installed initially. Monthly monitoring and baiting was conducted during the peak termite foraging season of 2002, from April to October. Additionally, a final inspection was completed in March 2003 to assess the impact of auxiliary stations on post-winter termite activity.

During each station inspection, termite activity was recorded as present or absent and those with new termite feeding were randomly divided into two treatments, auxiliary and non-auxiliary control. In the auxiliary treatment, termites were placed into a Baitube™ device and three auxiliary stations containing wooden monitors were installed with a power auger, 25-30 cm from the active station and evenly spaced at 120-degree intervals. During subsequent monitoring visits, auxiliary stations with active termite feeding in the wooden monitors were switched to a Baitube. In the non-auxiliary control, termites also were placed into a Baitube, but no auxiliary stations were applied. Cellulose Baitube devices without active ingredient were used to avoid impacting foraging. The amount of cellulose matrix left in the Baitube was visually estimated during each monthly inspection. Tubes were replaced when consumption was greater than 50 percent. To compare consumption between treatments, we combined bait matrix consumption estimates of the parent station and surrounding auxiliaries in the auxiliary treatment.

A *z*-test for comparison of proportions (Sigmastat, SPSS, Inc., Chicago, IL) was used to compare the rate at which termites found auxiliary stations to that of all stand-alone stations. The number of active station locations that remained active over time in the two treatments was also compared with the *z*-test. A *t*-test (Sigmastat, SPSS, Inc., Chicago, IL) was used to compare the mean consumption per month between the treatments.

After monthly monitoring for six months, 16 of the 183 original, stand-alone stations were found by *Reticulitermes* spp. termites at six of the eight homes. Thus, eight stations were randomly assigned to the auxiliary treatment and 24 auxiliary stations were placed. Fourteen of those were found by termites. The total percent of auxiliary stations that termites found (58%) was much higher than that of stand-alone stations (9%). The difference between the treatments was highly significant at $\alpha = 0.05$ ($z = 6.071$, $P < 0.001$).

After six months of monitoring, we were able to maintain feeding in only two of eight active station locations in the non-auxiliary treatment. In our auxiliary treatment, four out of eight had activity in the parent station or in one or more of the auxiliary stations associated with it. After 11 months, only one of the non-auxiliary stations was still active, while four of the auxiliary treatment locations were still active. Although differences were not statistically significant at $\alpha = 0.05$ (6 months $z = 0.516$, $P = 0.606$; 11 months, $z = 1.055$, $P = 0.291$), a four-fold increase in feeding stability was observed.

During the six-month baiting period 31.5 baittubes were consumed by termites with 9.7 in the non-auxiliary treatment and 21.8 in the auxiliary treatment. Comparing mean percent Baitube device consumption/month between treatments, the non-auxiliary mean was 49.5% versus 90.6% in the auxiliary treatment. This difference in consumption was not statistically significant at $\alpha = 0.05$ ($t = -1.834$, $df = 14$, $P = 0.088$).

Based on a statistically significant six-fold increase in feeding after six months alone, we recommend using auxiliary stations in termite baiting programs. This recommendation is further supported in that both long-term feeding and bait-tube consumption were substantially, but not significantly higher with the auxiliary treatment.

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## Summary

Eight homes with a newly installed Sentricon System were studied for 11 months to assess the benefits of placing auxiliary stations around stations with termite activity. Auxiliary stations developed active termite foraging at a significant rate over six times greater than that seen in stand-alone stations. Although results were not statistically significant at $\alpha = 0.05$, use of auxiliary stations improved our ability to maintain termite foraging in active stations over time by 36% and increased overall consumption of bait matrix by 41%.

## References Cited

Henderson, G., K. Sharpe-McCollum, and C. Dunaway. 1998. Subterranean termites (Isoptera: Rhinotermitidae) attack on ground monitors around an apartment complex in fixed pattern placements versus conducive placements. Florida Entomol. 81: 461-464.

Jones, S. 2003. Targeted versus standard bait station placement affects subterranean termite (Isoptera: Rhinotermitidae) infestation rates. J. Econ. Entomol. 96: 1520-1525.