

References to Applied Thermal Pest Treatment Efficacy Data

Lethal Thermal Heating Effects of Insects

Forbes C. A. and W. Ebeling (1987) Found that “Nymphs of *I. Minor* died if exposed to 51 degrees Celsius for more than 10 minutes.” *The IPM Practitioner* 9(8):1-5. These research results form the basis for recommendations for heat fumigation of structures. 51 degrees Celsius = 123.8 Degrees Fahrenheit.

Bowler K. J. (1981) *Thermal biology* 6:171-178 and W. Ebeling (1994) *IPM Practitioner* 16(2):1-7. “Death from exposure to excessive heat no doubt has a complex mechanism. Hyperthermia affects insects at a cellular level, disrupting the function of cell membranes and stability of enzymes. “

Locatelli D. P. and Traversa (1989) “Microwaves can be used to heat the substrate and then subsequently kill the infesting insects by extreme temperature.” *Ital J. Food Sci.* No. 2:53-62.

Hall D. W. (1981) “Microwaves can also act directly on insects within relatively dry substrates by agitating water and/or fat molecules. Friction caused by this agitation creates heat which likely causes death by protein denaturation and membrane disruption.” *Taxon* 30(4):818-819.

Venard R. Lewis (1996) “Without a doubt, sufficient microwave energy applied to infested wood will kill termites.” UC Berkeley Report project #84IA8011-00 Paragraph 3 page 46.

Product manufacturer note:

During treatment application with the Proto2 GE575 and Proto3 GE1150 Pest Device, temperatures are monitored with the use of a temperature probe for assurance of adequate temperature dosage application. To insure lethal heat exposure and duration time, minimal lethal dosages listed for target labeled pests are approximately 6 degrees or higher than the referenced scientific research studies established standard lethal levels of exposure, being 123.8 degrees Fahrenheit maintained for 10 minute duration by heating of the insects substrate.

Lethal Thermal Heating Effects on Wood Destroying Fungi

USDA Forest service Research paper FPL 190 (1973) Revised (1979) “Naturally occurring sub zero temperatures merely inactivate Fungi, but high temperatures kill them. The lethal effect of a high temperature depends on the specific temperature and the length of time it is applied. A temperature below about 150 degrees Fahrenheit probably would be impractical as an eradication measure because it would have to be applied for an excessive length of time. “ Page 11 Moderate temperatures.