

LARGE SCALE DESINFESTATION BY SUSTAINABLE ANOXIA TREATMENTS AND INTEGRATED PEST MANAGEMENT OF HISTORIC AND CULTURAL HERITAGE

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Churches, museums, libraries and other cultural institutions often suffer from wood-boring insect attack, causing severe damage and losses to their property and collections. Frequently, these infestations are caused by either termites or the larvae of tiny wood-boring beetles. Most recently, there have been several alarming reports of specialists from the Universidade Federal de Vicosa (UFV), MG, stating, that literally “100% of the historic buildings like churches in Ouro Preto as well as in most other cities and states in Brazil, are infested with wood boring insects and at risk to be lost entirely within the next 20 years”. This shows, that even though institutions are aware of these infestations, the effective control becomes extremely difficult because the conventional method and approach is based mainly on the use of toxic chemicals (pesticides) that may often not be applied easily in cultural heritage, due to lack of access or risk of contamination. However, there are more recent sustainable methods using green technology without the application of chemical substances or products. Among these methods, the most universally applicable is undoubtedly anoxia, always in combination with the implementation of an integrated pest management program (IPM). Anoxia is entirely non-toxic and completely harmless to objects of any kind, without side or residual effects, while having scientifically proven to efficiently eliminate all insects in all developmental stages (eggs, larvae, pupae, and adults). Yet, creating and maintaining an anoxic atmosphere on a large scale is highly complex and requires custom made technology in order to control oxygen levels, relative humidity and temperature at all times during treatment. Anoxia treatments also require gas tight sealing of the object/s in special gas barrier films or chambers in order to be effective. This work will present a new technology, using a custom made microprocessor controlled equipment with precision sensors for continuous data logging and control of oxygen concentration, relative humidity and temperature. This digital control unit, constantly monitors and records the conditions inside the anoxia bubble, throughout the treatment, which is a main requirement in order to assure the efficacy of the process. Also presented is a new normed standard, containing live insect larvae in order to prove treatment efficacy and insect mortality using *Hylotrupes bajulus*, one of the most resistant wood boring species known. Whenever non-toxic pest control or disinfection treatments without residual effects are carried out, it is essential to implement effective preventive measures in order to avoid possible re-infestations. Over the past 20 years or so, a unique methodology of integrated pest management in the area of historical and cultural heritage has been developed that attends the specific needs of such institutions. This methodology will be briefly described with its main elements as well as several case histories.

Key Words: Non-toxic pest control, termites, wood boring beetles, churches, museums, libraries