# Pasteuria Field Studies using endospores to control sting nematode on turf.

Hewlett, T.E., Waters, J. P., Pasteuria Bioscience Inc., 12085 Research Drive Suite 185, Alachua Florida 32615;

The sting nematode, *Belonolaimus longicaudatus*, causes extensive damage to turf on golf course and athletic fields in the southeastern United States. The few remaining nematicides used to control this problem are heavily restricted in their use and expensive. *Pasteuria* species parasitizing sting nematodes have been observed in most of the southeastern states and undoubtedly are ubiquitous parasites of this nematode. Studies have demonstrated that high soil densities of *Pasteuria* endospores in the soil can suppress sting nematode populations. Economic control of a nematode population using *Pasteuria* depends maintaining a high density of the endospores in the soil. Previous work with *Pasteuria penetrans* for control of root-knot nematodes, in microplot studies, has demonstrated that the minimum soil density of endospores in soil for economic control is 100,000 spore/cc of soil. Field studies of *Pasteuria* as biological control agent for sting nematode have been impossible as infected sting nematodes produce very few spores and are difficult to collect from the soil; and the bacteria were thought to be an obligate parasite of the nematode. *In vitro* produced *Pasteuria* sp. endospores, cultured by Pasteuria Bioscience Inc. from infected sting nematodes, were used to produce the first liquid and granular formulations of *Pasteuria* spp..

The objective of these experiments was to determine the efficacy of a liquid and granular formulation of *in vivo* produced *Pasteuria* endospores for control of sting nematode on turf. These tests were applied in the spring of 2008. Seven sites were chosen on golf courses located in central Florida, South Georgia, Mississippi and North Carolina. Rates of applications of the liquid and granular formulation included 5 $x10^{10}$, 1 x $10^{11}$, or 0 endospores applied to1 .5- $m^2$ plots, replicated 5 times. Soil samples were taken at 15 days after treatment and at three 30-day intervals thereafter. Data collected included number of sting nematodes alive and dead and percent of nematodes encumbered with endospores in 100$cm^3$ of soil, turf health, and root growth. The initial 15 day soil sample data showed a significant ($P<0.05$) decrease in nematode populations, below the economic threshold level, at four sites, but at two sites in central Florida, sting populations were not reduced and/or results were inconsistent.

The initial data show that our product does infect and kill sting nematodes. The inconsistencies are thought to be linked to the soil type and management practices

of the different golf courses. Our formulations rely on water to move the spores into the turf root zone. The speed and density at which they are delivered in to this zone and the length of time the endospores density stays at or above 100,000 spores/cc in this zone are major factors in determining the length of efficacy of this product.