



A Preliminary Study of Tiger Beetles at Brookhaven National Laboratory



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Abstract

Tiger beetles (Family Cicindelidae) are predatory insects that are a useful indicator species for scientists and land managers when developing baselines. In this study, two unique tiger beetle habitats are studied and examined for various characteristics. Examinations of tiger beetle presence, abundance, and tagging techniques are all touched upon. Information and inferences drawn from this preliminary study of tiger beetle colonies will be used next summer as part of population colony estimation. Additional ideas are also presented toward use of techniques here for studies involving students in grades 7 – 12.

Introduction

The order Coleoptera, more commonly known as beetles, is one of the most diverse groups of organisms within the animal kingdom. One important sub grouping are the tiger beetles (Family Cicindelidae), which are an important asset to any ecosystem. With over 2,300 different species known, these predatory insects have a global distribution - they have been found on every continent except Antarctica [1]. They are predatory creatures, who in turn are prey for higher level carnivores. Thus, they are an important link within any ecosystem. In addition, they have several other special characteristics: a high habitat specificity of species, conspicuousness in the field, and, last but not least, availability of specialist taxonomists able to identify them worldwide to the species level. [2 & 3] As a result, tiger beetles are an excellent and inexpensive indicator species to the environment, allowing land managers to detect any problems within an area before they become too great.

At Brookhaven National Lab (BNL), many different tiger beetles have been sighted here. Located at the western end of the Pine Barren region of Long Island, it is an excellent habitat for several different species. Depending on the time of year when study is taking place, determines the species available for study. Observations performed during the summer months have detected a relative abundance of the Punctured Tiger Beetle (*Cicindela punctulata*) and the Six-Spotted Tiger Beetle (*Cicindela sexguttata*) at various locations. These areas include along the North and East Fire Breaks but, they have also been spotted in various other locations throughout the Laboratory property.

However, even though it is known where these insects live, very few studies have been done on the estimates of population size and the area that the population inhabits. The purpose of this poster is to document a preliminary study of the tiger beetles found during the summer months at BNL and to see what techniques are feasible to conduct a population estimate next summer.

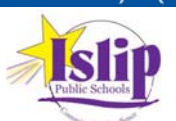
Methods

Two different locations approximately 2 miles apart were selected: Site A (A) & Site B (B) (Figures 1 & 2). These locations were selected based on repeated prior observations of tiger beetle abundance and to see if the differences in vegetation yielded different results. After reaching each location by a 4-wheel drive vehicle, tiger beetles were captured using nets over the course of 45 minute increments. Each one was then subsequently tagged with a number using non-toxic, water-resistant ink (see figure 3), had its location recorded using a global positioning system (GPS) unit, and then released back into the environment. After a period of 48 hours, we returned to the location and recaptured as many of the originally tagged tiger beetles as possible in a span of 45 minutes and recorded their new positions into GPS. This process was repeated an additional time, for a total of 3 visits per site.

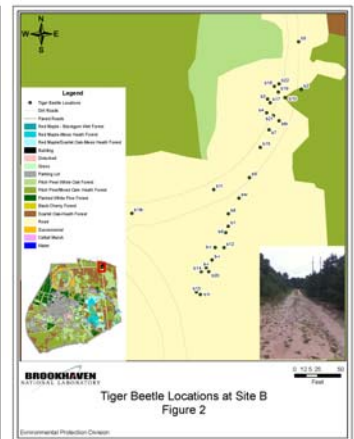
In addition, weather data was recorded by use of a Kestrel hand held weather station every half hour and noted to see if weather would have any effect on the tiger beetle presence.



Figure 3: The process of tagging a tiger beetle. It should be noted that this process works best with two sets of hands, one to hold to beetle while the other set can label the beetle



Tiger Beetle Locations at Site A
Figure 1



Tiger Beetle Locations at Site B
Figure 2

Results

The results can be seen in the diagrams above (Figures 1 & 2). However, it should be noted that this is a listing of all beetles that were caught – this does not include beetles that were sighted and unsuccessful captured, or beetles that were caught, but managed to get away before tagging or position marking with GIS.

The species with the greatest numbers of tiger beetles seen, captured, and recaptured was the Punctured Tiger Beetle. There were a few of the Six-Spotted Tiger Beetles that were sighted and initially captured, however no beetles of this species were recaptured during the course of this study. In addition, at A, there were a greater number of recaptures than there were at site B.

It should also be noted that in 3 instances, recaptured tiger beetles were caught with tagged numbers that were difficult to distinguish, due to the wearing away of the ink. These captures are indicated by a "-" symbol.

Discussion

The information gathered agrees with prior observations made for this region. Tiger beetles are present within these areas. Based on observations made during this study, one could venture an inference that there are more tiger beetles located within Site B than there are in Site A. Further studies would need to be performed here using a mark and recapture program, like MARK.

The marking pen was unsuccessful in truly marking the beetles. Reasons why the marking pen was unsuccessful could possibly include: the ink wasn't fully allowed to dry before marked beetles were released, the beetles lifestyle of burrowing and rubbing against sediments, or natural oils within the beetles interacted with the ink to cause the ink to wear off.

Future studies of this area are planned in the future using the same technique, but with the changes suggested by this discussion and over a longer period of time. It should be noted that this would be an excellent project to be done with students, especially those in grades 7-12, since the technique is something not too difficult to perform and requires relatively inexpensive materials to perform.

References

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