# EFFECTS OF HUMAN DISTURBANCE ON GROUND BEETLE DIVERSITY

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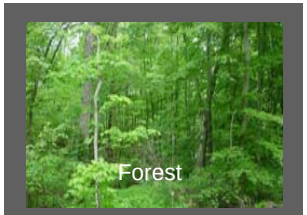


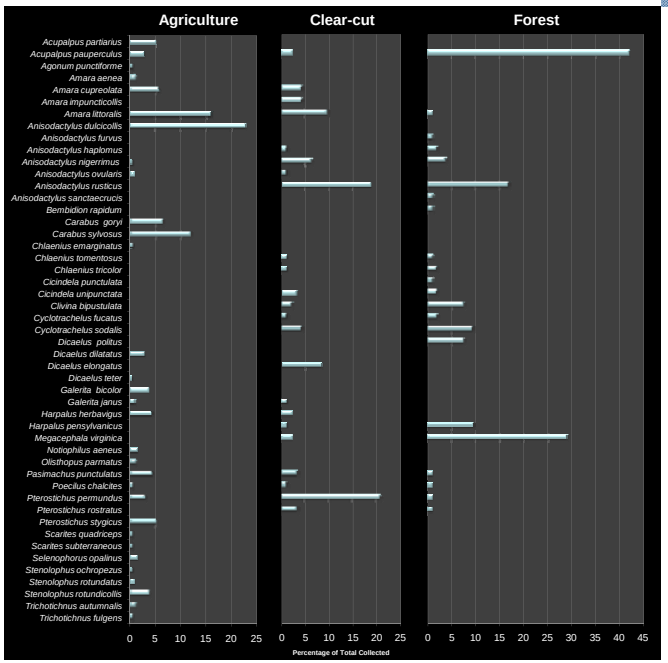


*Figure 1. Land-use treatments Included agricultural, clear-cut, and forest landscapes.*


## METHODS

***We evaluated the effects of land use on the diversity of ground beetles*** in central Kentucky by using pitfall trap data collected between 2005 and 2008 in forest, clear-cut, and agricultural sites in and around Berea, Kentucky. (Figure 1) These treatments represented a range of human disturbance frequencies and intensities with the agricultural sites representing high and frequent land disturbance and the forest sites, minimum disturbance (Figure 2).

*Figure 2. Ground beetles collected and their relative abundance in each of the three land-use treatments.*

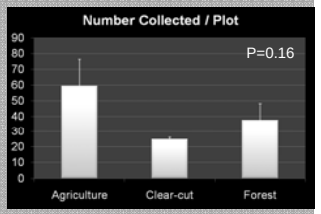


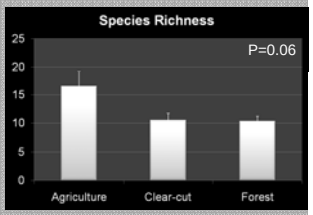

## INTRODUCTION

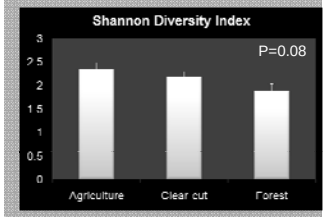
Understanding the influence of human disturbance on biological diversity is important for guiding resource use and ecosystem management in a world with an increasing human population, diminishing natural resources, and impaired ecosystem functioning. ***Insects are useful biological indicators for monitoring the effects of human activities*** because of their ubiquity and ground beetles (Coleoptera: Carabidae) in particular may be good indicators as they are among the most common soil-dwelling insects found living in temperate ecosystems and relatively easy to sample.

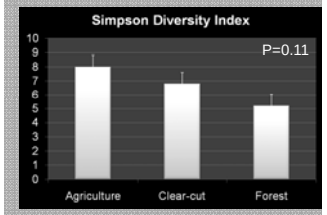
*Figure 3.(Above). Selected carabid species collected in the study: (clockwise from upper left)* **Dicaelus dilatatus, Cicindela unipunctata, Megacephala virginica, Pasimachus punctulatus, Carabus goryi, and Agonum punctiforme.**

*Figure 4. (Right). Effect of treatment on species richness and diversity (Shannon and Simpson indices) as well as the number of average number of specimens collected per plot.*




## RESULTS & DISCUSSION

Approximately 500 ground beetle specimens were collected, representing 49 species (Figures 2 and 3), 13 of which have not been reported to occur in Kentucky previously. Although ***species composition was influenced by land use, species richness and diversity were not significantly reduced*** with increasing disturbance (Figure 4). This is somewhat surprising given the number of studies demonstrating the negative impacts of agriculture on ground beetles. It is possible that the lack of treatment differences is at least partially due to the relatively small samples sizes, but presently this data set, collected over a 4-year period, indicates that although species composition is influenced by land-use, greater disturbance does not necessarily result in reduced diversity.