



# Effect of a prescribed burn on the flying insect population in a glade at Blackacre State Nature Preserve, Jefferson County Kentucky



Andrea L. Almeida, Amy M. Cummins, Phaedra Jones, and Susan H. Reigler  
Department of Biology, Indiana University Southeast, New Albany, Indiana 47150

Contact: [sreigler@ius.edu](mailto:sreigler@ius.edu)  
812-941-2016

## Introduction

In March, 2005 the Kentucky State Nature Preserves Commission conducted a prescribed burn to restore the herbaceous flora in a dolomite glade at Blackacre State Nature Preserve, Jefferson County Kentucky (Figure 1). To measure the procedure's effectiveness, a Malaise trap was used to survey the flying insect population pre- and post-burn, in 2004, 2005, and 2009 (Figure 2). Malaise traps are especially effective in surveying Diptera and Hymenoptera, important pollinators of herbaceous plants, as well as other flying insect families. By 2009, the increase in total insect families from 2004 was 77.7%. The increase in Diptera and Hymenoptera was 72.2%. The number of individual Cicadellidae (Hemiptera) – insects also associated with herbaceous plants – increased 710.0%. Together, these population changes suggest recovery of the glade flora.



Figure 1. Map of Blackacre State Nature Preserve in Louisville, KY.



Figure 2. Map of glade area and malaise trap location.

## Methods

From July 25 to July 31, 2004, the year prior to the burn, a malaise trap (BioQuip model #2875D Townes Pattern) was set up in the glade area (38 degrees 11 48.06 N 85 degrees 32 03.30 W). The trap's collecting head was charged with 70% ethanol (Figure 3). The malaise trap was placed at the same location in the glade from July 25 to July 31, 2005, after the burn had been conducted that spring. A third collection was taken four years later in 2009.

The trap was placed in the same location at the same time of year in order to minimize seasonal fluctuations. Insects were identified to family level using stereomicroscopes (Wolfe StereoPro) and taxonomic keys (Triplehorn and Johnson, 2005). (Figure 4). Tables and graphs summarizing data were created using Microsoft Excel, 2007.



Figure 3. Malaise trap.



Figure 4. Identification of collection.

## Results

In 2004, 86 insects were collected in 18 families. Of those 18 families, 15 were either Diptera or Hymenoptera. In 2005, 123 insects were collected in 24 families, 17 of which were Hymenoptera or Diptera. In 2009, 218 insects were collected in 32 families, 28 of which were Diptera or Hymenoptera.

The increase in total families from pre-burn 2004 to post-burn 2005 was 33%. The increase in Hymenoptera/Diptera families from 2004-2005 was 13.3%. Five years after the burn, the increase was 77.7% in total families and 72.2% in Diptera/Hymenoptera (Figure 5). Another notable increase occurred in Cicadellidae (leafhoppers) where number of individuals collected increased 710% from 2004-2009 (Figure 6).

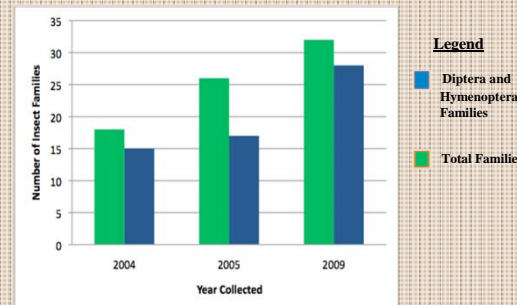


Fig. 5. Number of Families Collected

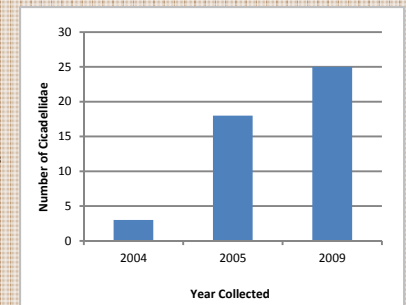


Fig. 6. Number of Individual Cicadellidae Collected

## Discussion

Both Hymenoptera and Diptera are essential in the pollination of native flowers and forbs. A notable increase was observed in total number of insects and diversity of families, especially the Hymenoptera and Diptera. The 72% increase in Diptera/Hymenoptera and the 710% increase in Cicadellidae (leafhoppers) is a positive indicator that the glade ecosystem is recovering. Findings would suggest that our data is in alignment with that of other studies (Campbell, et al 2007; Panzer, 2002), in which similar increases were observed after a prescribed burn.

A continuation of the study is recommended for the next five years, possibly adding new locations throughout the glade. This would help with the interpretation of data that may have been a result of 2009 weather conditions. In addition, sampling during different seasons may also provide useful information about the glade ecosystem.

## References

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