

Annual Report

Period Covered by the Report: August 2001 – December 2002

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Title: A PRELIMINARY SURVEY OF AERIAL AND GROUND-DWELLING INSECTS OF THE MOBILE / TENSAW DELTA

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Research Category: SGER

Project Period: 08 / 01/ 2000 – 12/31/2003

Objective(s) of the Research Project

In 1995 Mobile Bay became a part of the country's National Estuary Programs (NEP). Included in the NEP study area are the Bay proper and a large section of the Mobile/Tensaw Delta. Much of the 250,000 acres of cypress-gum swamps and bottomland hardwood forests that form the Delta is relatively undisturbed; this is a remarkable fact given that the Southeast has a much lower percentage of protected land (5.0% of the nation's total) than most other regions of the country (Loomis & Echohawk, 1999). In addition, 15% of the nation's water (excluding Alaska) runs through the Delta. While we suspect that the Delta harbors a wealth of biological diversity, little of the biota has been documented. Using SGER funds provided by ACES, a preliminary assessment of the aquatic insect biodiversity of the Mobile/Tensaw Delta was initiated in the spring of 2000. The current study is the next logical step in a preliminary assessment of the Delta, i.e., a survey of aerial and ground-dwelling insects and a depository for representative specimens. Extrapolating from the literature (e.g., Borror et al. 1992), we conservatively estimate that between 10,000 and 70,000 species of insects inhabit the Delta, many of which will be new to science. Our specific objectives of the proposed study are as follows:

1. Produce a preliminary inventory of adult aerial and ground-dwelling insects of the Delta including pest species and vectors of human disease (primary objective).
2. Provide a preliminary assessment of the terrestrial diversity of the Delta based on the adult insect fauna.
3. Establish a metric between habitat location and faunal differences.
4. Examine temporal changes in the adult biota.
5. Link patterns of biodiversity and species distributions to higher order ecogeographic features.

Progress Summary/Accomplishments

Preamble: To date, insect collections were made monthly from August 2001 to September 2002. All specimens collected have undergone initially sorting and preservation. This represents the completion of the primary field component of this study. Specimens can now be sorted to family and sent to the appropriate taxonomic authorities for identification.

Methodology - aerial insect: Three study areas were selected: Byrnes Lake (30°47.566'N 87°54.552'W), Lizard Creek (30°52.696'N 87°57.504'W) and Raft River (30°46.354'N 87°56.788'W). Aerial insects were sampled using Malaise traps. Each Malaise trap consists of a system of fine-mesh net baffles which end in a large collecting net. Each trap is approximately 2.5 x 2.0 m x 1.0 m (H x L x W) and is extremely effective at collecting fly insects (e.g., Darling & Packer 1988). The top of the collecting net terminates in a plastic canister that holds 1 liter of 95% ethanol (preservative). Each trap passively intercepts flying insects as they hit each baffle. Insects then work their way to the collecting canister where they are preserved in ethanol. At each site 4 Malaise traps were placed 25 m apart along a 100 m linear transect. Traps were operate for 1-week intervals, once each month, from August 2001 to September 2002

Methodology - ground-dwelling insects: Between the middle two Malaise traps at each site, a series of pitfall traps were placed to assess the ground-dwelling insect community. Pitfall traps are a standard sampling protocol for ground-dwelling insects (e.g., Spence & Niemelä 1994). Each pitfall trap consists of a plastic cup (top diameter = 9.0 cm; length = 12.0 cm) sunk into the soil with the open end flush with ground level. Approximately 50 ml of nontoxic antifreeze is added to each cup to act as both a means of trapping insects that fall into a trap, as well as a preservative, until cups can be retrieved. Thus, each trap passively intercepts crawling insects as they fall into the cup. Four traps were placed along a single transect line at 5 m distances. Four transects, each 10 m apart were placed at each site (= 16 traps / site). Traps were left in the field for 48 h before being retrieved and were run on a concurrent schedule with the Malaise traps.

References Cited

- Borror, DJ, Triplehorn, CA & Johnson, NF. 1992. An introduction to the study of insects. 6th ed. Saunders, Philadelphia.
- Darling, DC. & Packer L. 1988. Effectiveness of Malaise traps in collecting Hymenoptera: the influence of trap design, mesh size, and location. *Can. Entomol*
- Loomis, J & Echohawk, JC. 1999. Using GIS to identify under-represented ecosystems in the National Wilderness Preservation system. *Environ. Conservation* 26: 53-58.
- Spence, JR. & Niemelä JK 1994. Sampling carabid assemblages with pitfall traps: the madness and the method. *Can. Entomol*.

4. Significance

Given that the Southeast has a much lower percentage of protected land than most other regions of the nation, the need for a complete Delta bioinventory becomes particularly urgent. It is clear that we will only be able to preserve a small fraction of the earth's fauna in parks and reserves. Thus, management decisions in these preserves will be crucial for protecting the world's decreasing biodiversity and as 'seeds' for other areas under restoration. The first and most critical step in proper management is an accurate inventory of the taxa present.

Publications/Presentations:

McCreadie, J.W., & Adler, P.H. 2002. Total insect bio-inventory project of the Mobile / Tensaw Delta. Ann. Meeting of the Entomol. Soc. Am. Fort Lauderdale, FL. Nov. 17-20, 2002.

Future Activities:

This will consist of continued sorting and identification of insect specimens collected in the Malaise and pitfall traps. Once identified, specimens will be deposited into the University of South Alabama Arthropod Depository and the data entered into the USAAD data base. Future analysis of the data will consider the spatial distribution of species richness, diversity and abundance.

Supplemental Keywords: terrestrial, survey, faunistics, insect,

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