

The Trichoptera of Nicaragua

Maria Lourdes Chamorro
University of Minnesota

The goal of my project is to survey the Caddisfly, or Trichoptera, fauna of Nicaragua. Trichoptera are an important component of freshwater systems, contributing to the transfer of energy and nutrients through all trophic levels (Wiggins, 1996). Because of the very different susceptibilities of the various species to pollutants and other types of environmental disturbances (Rosenberg & Resh, 1993) they are extensively used in biological monitoring programs in temperate regions where knowledge of the taxonomy and ecology are well known. These methods have not been very effective in the Neotropics because the fauna is poorly known. Before biomonitoring protocols can be practically implemented in the Neotropics, the identity of the aquatic insect fauna must be determined. My research will provide a basis of knowledge and resource in Nicaragua for future study of the taxonomy, ecology, and conservation of this group of insects.

The major environmental concerns in Nicaragua are deforestation, soil erosion, water pollution and damage from powerful tropical storms. In addition, Nicaragua has begun to recover from a ten-year civil war and from economic depression after the downfall of the communist regime in 1990. The new democratic government established numerous reserves throughout Nicaragua, stressing the importance of preserving the country's natural resources. Central American forests, and the diversity they harbor, are being threatened by unsustainable agricultural practices and rapid population growth. Choosing between economic growth and conservation of the country's diversity has proven to be a struggle that the environment is losing. It is of great importance to survey our biodiversity before it is too late.

Currently, the caddisfly fauna of Nicaragua is understudied, with 119 species recorded. For example, in neighboring Costa Rica, 463 species have been recorded. Nicaragua and Costa Rica have similar geographic and ecological zones. I believe the number of Trichoptera species will be similar for both countries. Nicaragua, as well as the rest of Mesoamerica, except for maybe El Salvador, are divided into three ecological zones. The lowland areas in Nicaragua with an extended dry season occur in the Pacific Coast region, from Chinandega to Rivas. Because of their rich soils, lengthy rainy seasons, and relatively abundant precipitation most of this zone

has been converted to agriculture (Mayne, 1999). The second zone, lowland areas with a short or no dry season, extends throughout the eastern two-thirds of Nicaragua, including the North Atlantic Autonomous Region, the South Atlantic Autonomous Region (Miskito Coast), Rio San Juan, Chontales, Zelaya and parts of Matagalpa and Jinotega (Mayne, 1999). In this zone are found half of the remaining forests that are severely threatened (Mayne, 1999). Included in this region are three reserves; the 12,000 sq km Miskito Cays coastal reserve, the 7,000 sq km Bosawas Reserve (Towle, 1991), and Indio Maiz Reserve. An area located across from the Costa Rican border. The third zone comprising the highland areas, slightly intrudes into the mid-western portion of the country, including part of Estelí and Nueva Segovia.

The best method to collect adult Trichoptera is with light traps. For this study alcohol pan traps are augmented with the use of black light & bed sheet. Alcohol pan traps consist of placing a black light (ultraviolet light) over a white pan containing ethanol or isopropyl alcohol. The trap is then placed as close as possible to the water's edge. The disadvantage of using alcohol to collect and preserve adult Trichoptera is that they lose their color more rapidly than specimens on pins. The hairs on the wings are very useful diagnostic characters, especially for most species in the genus *Nectopsyche* (family Leptoceridae) (Holzenthal, 1995). Nevertheless, specimens collected and preserved in alcohol are more pliable, have less shrinkage and therefore make it easier to identify. Alcohol pan traps are particularly important for the collection of species in the family Hydroptilidae (microcaddisflies), especially at sites where they are very abundant. Hydroptilidae is one of the most diverse families of Trichoptera in the tropics as well as in the temperate regions.

The black light & bed sheet collecting method allows for the tiny hairs on the wings to be retained. Trichoptera are directly collected from the sheet with the use of cyanide jars. The use of a 6volt battery provides the necessary energy to run the black light for several nights. These specimens are then individually pinned. Specimens collected will be deposited in the University of Minnesota Insect Museum, National Museum of Natural History, and at the Museo Entomológico in León, Nicaragua, which is run and owned by Dr. Jean-Michele Maes.

Currently, I have collected in all three zones using both methods of collecting. During the year 2000, I spent one week in the spring and two and a half months in the summer collecting in

the following areas of Nicaragua: Two separate collecting trips into the montaine rainforests of Jinotega and Estelí, two trips to Rivas and one into the very dry lowland areas of Carazo. I also traveled to Río San Juan, a river that runs along part of the Nicaraguan and Costa Rican border and flows from Lake Nicaragua into the Atlantic Ocean. I obtained better results in the summer when I collected closer to the Indio-Maiz reserve along the river.

The first two trips allowed me to become familiar with the different ecological areas and with potential collecting sites. I made important contacts with scientists, landholders and government officials. I made collections at one or two localities within the three regions. I have sorted through the samples I brought back and most sites have resulted in successful collections. I hope to further collect in areas that were off-limits or difficult to access during my previous trips to the country. These are the highland area of Nueva Segovia, the Bosawas Biosphere Reserve on the northwestern part of the country, as well as the Miskito Coast and the lowland areas of Chontales and Boaco. Land Mines from the war are still present in some parts of Nueva Segovia as well as sections of Chontales and Boaco and knowledgeable vaqueanos (guides) are necessary to travel the area. Armed guerrilla groups are present in the Bosawas Reserve and part of the Miskito Coast, affecting their accessibility. I expect these areas to be accessible during the summer of 2001. The Atlantic Coast (Miskito Coast) of Nicaragua is currently safe to travel. It is of high priority for me to sample this area since only few collections have been recorded for the Atlantic Coast of Central America. It would be interesting to observe any differences or similarities between the Trichoptera fauna of the Pacific and Atlantic.

Collecting permits are necessary to collect in protected areas. These are obtained from the Ministry of Natural Resources (MARENA). I am currently undergoing the necessary procedures to obtain these permits.

I have made considerable progress on my research thus far, yet further collections are necessary to accurately represent Nicaragua's Trichoptera fauna. Hence, the importance of a final collecting trip to Nicaragua.

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