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## Overview of Study Areas and UNAM-Iztacala Student Research

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## OVERVIEW OF STUDY AREAS AND UNAM-IZTACALA STUDENT RESEARCH

**Jonathan Franco-López and Jose Antonio Martínez-Perez<sup>1</sup>**

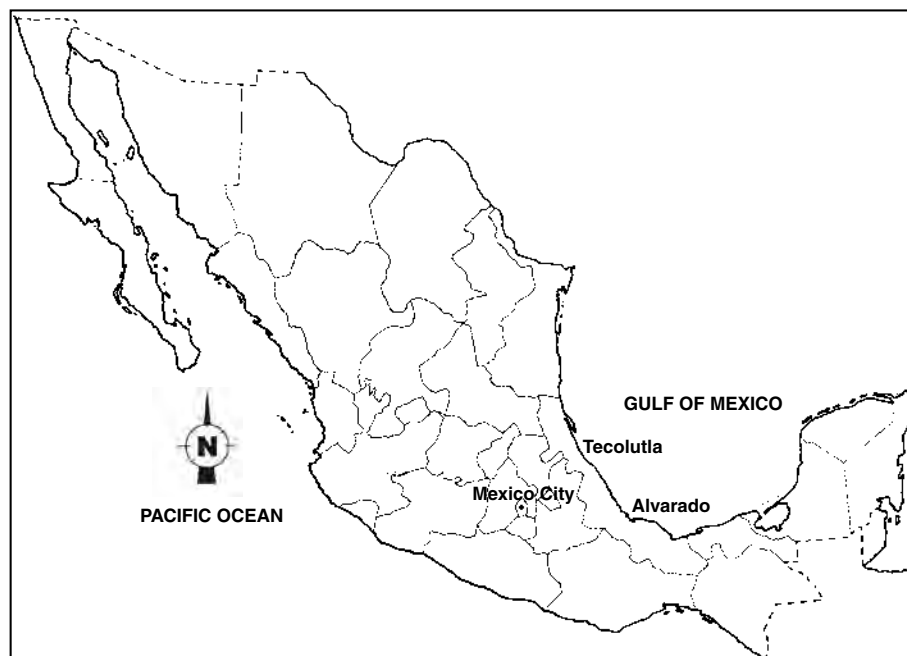
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The State of Veracruz is located on the east coast of Mexico and consists of many shallow marine systems such as estuaries and coastal lagoons. These estuarine systems are ecological sites of great importance due to the interactions that occur between the intertidal zones and adjacent areas. This importance is reflected in the variety of natural components present in these sites as well as the large number of species that depend on this aquatic zone, such as birds, mammals, molluscs, crustaceans and fishes. Many of the crustaceans and fishes are consumed by the local inhabitants and distributed in commercial areas in Mexico City. It is estimated that Veracruz state is in fourth place in fisheries landings for the country, and contributes 10% of the total fisheries production.

Academic personnel from the laboratories of Ecology and Zoology in the Facultad de Estudios Superiores Iztacala, Tlalnepantla, Mexico have focussed their research efforts since 1988 on two of the systems in Veracruz state, the Tecolutla River and the lagoonal system of Alvarado (Figure 1). Research in both locations has resulted in a number of professional theses by undergraduate students in the Biology Department at UNAM-Iztacala.

Tecolutla River is a typical estuary located in the north region of the state, and is formed by the confluence of the Necaxa, Axacal, Cempoala and San Pedro Rivers. The headwaters of the river system begin in the Sierra Madre Oriental and run southeast to northeast for a total of 100 km. The predominant activity in the area is tourism.

In contrast, the Alvarado lagoonal system is located in the south-central portion of the state and is comprised of 3 lagoons, Alvarado Lagoon, Buen País Lagoon and Camaronera Lagoon, covering a total surface area of 12,000 hectares. This lagoonal system is associated with the Papaloapan River, whose watershed covers an area of about 39,189 km<sup>2</sup>. The principal activity in the city of Alvarado is fishing, and the majority of the families in the city earn their living in this manner. The waters of the Alvarado Lagoon, the Papaloapan River and other minor rivers flowing into the Lagoon have a level of contamination of 40–60%, as a result of the diverse industries and population centers around the shores. As a consequence of this contamination, there has been a severe degradation in the ecological integrity of the lagoon, which has negatively impacted the fishing industry.



**Figure 1.** Map of Mexico showing areas of research in Tecolutla River and Alvarado Lagoon, and the physical relationship between sampling sites, and the location of the laboratory just north of Mexico City.

The majority of the research from Tecolutla River and the Alvarado lagoonal system has characterized the ichthyofauna of both systems based on the environmental changes of the hydrological characteristics. More than 80 species, representing 50 genera and 35 families of fishes have been recorded from these two systems. Much of the undergraduate work has focused on the biology of the most important families, including the Sciaenidae, Clupeidae, Cichlidae, Centropomidae, Gerreidae, Engraulidae, Syngnathidae, Belonidae, Batrachoididae, Gobiidae and Eleotridae. Research topics include information on the areas and times of reproduction, age and growth, gonadal histology, parasites, feeding habits and trophic niches as well as ecological relationships among species.

The diversity of ichthyofauna on the continental shelf of this zone is also quite high, with 158 species representing 97 genera and 72 families. Senior research involved with the ecology of the nearshore coastal ichthyofauna includes feeding patterns and partitioning food resources among trophic guilds, seasonal changes in the most species rich families, such as Sciaenidae and Triglidae, and studies of the shrimp by-catch.

The fundamental importance of these senior theses is the link they make between teaching and hands-on research, which is an important part of the student's academic preparation. The completion of senior research theses has resulted in students that understand biology as it is related to local fisheries in both the Tecolutla River and the Alvarado lagoonal system.