INVESTIGATION OF THE INTERMEDIATE SYSTEMATICS OF FOSSIL INSECTS COLLECTED AT THE CLARE QUARRY SITE IN THE FLORISSANT FOSSIL BED, FLORISSANT, COLORADO FROM 1996-PRESENT

Joseph Cancellare1, Joshua Villalobos1, David Lemone2, El Paso Community College1 University of Texas at El Paso2

Abstract
The Clare Quarry is a proprietary Quarry located in the town of Florissant, Teller County, Colorado, approximately 30 miles west of Colorado Springs on land proximal to the Florissant Fossil Beds National Monument. The elevation at the quarry face is 2600 meters ASL. 404939 dating of the upper beds of the Florissant formation indicates an age of 34.67 ± 0.60 Ma. An Oncorhynchus fossil jaw and other mammalian fossils place the formation in the Chatfieldian. Age of the lower beds in which the formation is underlain by the Mt. Massive Tuff dated at 37Ma, which sits on top of a Pecos Granite, which is Reap11702 Ma. In the Lake Elcoso, the Florissant region was lacustrine in nature due to the intermittent damming of the river valley which runs north into Florissant. The ash and lavas from volcanic eruptions in the Thirty Nine Mile Volcano Field formed impoundments that prevented shallow lakes for what is thought to have been a period of 8000 years. Repeated ash falls placed plant material and insect material in the lake and streams that were formed intermittently during the period. The ash layers in the Florissant Formation are very fine, graded, and contain diatomaceous mats that formed on the lake deposited ash layers, aiding in the preservation of plant and insect material.

Early work on Florissant fossils was done by Lesequifieras (plants) 1874, Stocker (insects) 1890, and Mac Ginty (plants) 1953. This project began 17 years ago and has consisted of collection trips ranging from one to eight days during the summer months. The collection consists of 2400 catalogued plants, insects, and fish fossils. To date classification is superficial. One of the early objectives of this work was to collect series of the same genus however there is no discernable pattern below the ordinal level due to the random nature of fossil preservation. In this phase the primary objective will be to place as many insect specimens into families as possible. Many insect families (but no genera) found in the Florissant fossil record today.

OBJECTIVE: To collect a sufficiently large sample of insect fossils to enable identification to the family level. The initial intent was to try to collect series of insect fossils that would allow the determination of Genera. Over the past 15 years collection trips of from two to eight days in a season have resulted in 2400 catalogued and stored accession numbers. Presently 450 insect fossils ranging in quality from poor to pristine have been separated from the main collection for study. To date there has been insufficient duplication of identifiable insect fossils in the collection to provide enough whole fossils that will allow work at this level. Currently 10 percent of the collected and stored material is insect. The_number of individual fossils in the collection are often in the 2mm range though there are occasional fossils which are well-preserved and of sufficient size to be recognized. Several whole fossil insects are known. Insect preservation is three dimensional and rotation and loss of appendages is common. Wings can be broken and overlapping making visualisation problematic in the identification process.

METHOD: The Shale in which the bulk of the collection is located is extremely diatomaceous. The result of this is many fossils become fused to the surface and covered with a layer of diatoms which appear to have improved preservation. Single edged razor blades, exacto knife chisels, and pins are used in locating and lifting out delicate insect parts. Field work tends to be gross while lab work is much finer. There is little hammer and chisel work but a lot of sorting and cleaning. Insect parts are to be small and faint compared to most of the plant material. Steel sawing pins are sharpened to very fine points on an oil stone which is part of the kit. Good steel sawing needles are best because there is little vibration due to flexing which can easily destroy a good specimen. In fine work these needles can easily follow a wing edge or an antenna when properly used. A compound called Vinactin B. which is supplied in the kit, is mixed with water and used for repairs of cracks and breaks in the shale. With the shale it is better used for repairing broken bone than for covering a specimen. When the Vinactin dries a leaves is shinny on what it is applied to and obscures detail in later viewing.

A dissecting microscope on an arm is used both in the quarry and in the lab. The scope has a zoom that will allow different eyes pieces to magnification from a minimum of 40 diopters. The moveable arm allows for use with different magnification of the object. Shale coming from the quarry is usually wet and should be dried. In the quarry shale is dried on plates or tasses. As the specimen the plates heat up and this makes the drying process is accelerated. A couple of weeks in an El Paso garage is effective. In the quarry an infrequent shower or storm can turn a day off into a short order. The use of a plastic wrap can guarantee a quick recovery or a good start on a following day.

IMAGING: Imaging of specimens is important as comparison with other collections and written descriptions takes the place of insect keys. The use of photographs and gigaPan imagery. The GigaPan imaging device with permission, Four Chambers Studio. to Collect a sufficiently large sample of insect fossils to enable identification to the family level. The initial intent was to try to collect series of insect fossils that would allow the determination of Genera. Over the past 15 years collection trips of from two to eight days in a season have resulted in 2400 catalogued and stored accession numbers. Presently 450 insect fossils ranging in quality from poor to pristine have been separated from the main collection for study. To date there has been insufficient duplication of identifiable insect fossils in the collection to provide enough whole fossils that will allow work at this level. Currently 10 percent of the collected and stored material is insect. The_number of individual fossils in the collection are often in the 2mm range though there are occasional fossils which are well-preserved and of sufficient size to be recognized. Several whole fossil insects are known. Insect preservation is three dimensional and rotation and loss of appendages is common. Wings can be broken and overlapping making visualisation problematic in the identification process.

CONCLUSIONS: At this stage of the study conclusions are premature. Future use of knowledge gained will have applications in c...


Field and lab accession notes

Reference data in spreadsheet form

Literature Cited

Acknowledgements

References