FINDING MOSQUITOES IN AMBER, COPAL AND COPALITE *BY TERRANCE M. ALLEN, S.C.E.*

During the last 25 years (since the release of the movie, "Jurassic Park," directed by Steven Spielberg in 1993, based on the best-selling novel, "Jurassic Park," by author Michael Crichton in 1990), amber has been sought out and valued for having fossil insects, spiders, and plant parts embedded within this fossilized tree resin. Now in 2015, with the release of the block-buster movie, "Jurassic World," mosquitoes in amber, entombed inside these naturally hardened jewels, are the most asked for. Termed "inclusions," organisms permanently encased and preserved in three-dimension have brought amber, copal and copalite* to a higher level of intrinsic, scientific, and of course, monetary value.

See AMBER verses COPAL, and Inclusions Within
MetaGuide Magazines Tucson Guide: 2013

Jurassic Park Mosquitoes and Dinosaurs

In reality, it is nearly impossible to find a piece of amber with a specimen of a mosquito. Michael Crichton sparked the imaginations of many when he used a mosquito entombed in amber in his story to bring the extinct monster dinosaurs back to life. By extracting the blood from a prehistoric mosquito which had been preserved in amber, and which had before then, fed upon and slurped up the blood of a dinosaur millions of years ago, he fancied a specious way to encode the "paleo-DNA" of the dinosaur-blood from the mosquito's gut. By filling in the missing gaps of the DNA molecular strands with blood from extant or living amphibians, genetic scientists could subsequently reproduce or clone real life-size living prehistoric dinosaurs.

Factually speaking, only a few dozen mosquitoes have ever been found in the world's supply of amber-fossilized tree resins. And, no mosquitoes have been found in amber from the Jurassic Period (141- to 202-million years ago). These uncommon and scarce specimens reside in museums, universities, and a limited few private collections. They are not only of scientific value, but when available to the public, they are usually priced from the mid-to high-hundreds to a couple of thousand dollars each because of their rarity.

Getting Trapped in Tree Resin

The majority of insects, spiders, and small animals that were trapped in the oozing sticky tree resin, which eventually polymerized and fossilized into amber over millions of years, generally were associated with the trees which exuded copious amounts of resin which later preserved their bodies in the amber. Mosquitoes would have inadvertently lighted to rest on the semiliquid tree resin and become stuck (like a fly on fly-paper), or they would have become victims of unpredictable winds which would have blown them off course into the resin-traps.

Male mosquitoes feed on the nectar of flowers (as females sometimes do too). But only female mosquitoes require a blood meal to obtain the proteins in which to produce and nourish their eggs. Thus, the number of associated deaths of mosquitoes being trapped in the liquid tree resin and preserved in amber is very small.

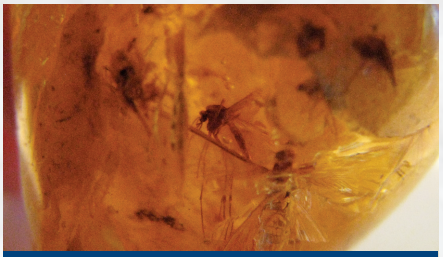
Finding Mosquitoes in Cretaceous Amber

Fact: Fewer than three confirmed mosquito specimens preserved in amber have been found and described from the Cretaceous Period—a time when dinosaurs ruled the Earth:

1) *Paleoculices minutus* Poinar et al. 2000, (approximately 75- to 80-million years old), a minute mosquito found and described in Canadian Amber.

2) *Burmaculex antiquus* Borkent and Grimaldi, 2004, (approximately 100-million years old) is the single mosquito species and oldest fossil specimen found in Burmese Amber (burmite) from Myanmar.

3) An unstudied mosquito specimen in Lebanese Amber (Azar), estimated to be 130- to 135-million years old.



Female Mosquito Found in Colombian Amber-Copal

Male Mosquito Found in Colombian Amber-Copal
Photos by Beatriz Aragon, October 19, 2015

Finding Mosquitoes in Amber and Copal… After the Dinosaurs

A few mosquitoes (five species have been identified and reported) are known from Baltic Amber (35- to 40-million years old =myo). But the majority of the mosquitoes (several dozen specimens) have been discovered in Dominican Amber from the Middle Miocene Epoch (20- to 23-myo). Another recent discovery reported a mosquito specimen in Mexican Amber also from the Middle Miocene.

Two female mosquito specimens have been reported and confirmed in two separate pieces of fossilized tree-resin (amber-copal) from Colombia, South America. These were found by Vincent T. Calabrese (//Stores.Ebay.com/Resin-Fossils, Big Run, PA). The first was found in September 2011 by Calabrese and confirmed in September 2015 by T.M. Allen (Sacramento, CA). The second was found in March 2014 by Calabrese and confirmed in September 2015 by Alex E. Brown (Berkeley, CA).

One single male mosquito specimen was discovered by T.M. Allen in fossilized tree-resin (amber-copal) from Colombia, South America (acquired and confirmed in 2014). This specimen was supplied by Marino Aragon (Aragon Enterprises, Harbor City, CA).

A single female mosquito specimen was discovered in Madagascar Copal. This was reported and confirmed in October 2015 by Alex E. Brown. This piece of Madagascar Copal was originally acquired in 2004 by the late Ron Cauble, Ph.D. ("The Bone Room" in Berkeley, CA), from the Tucson Jewelry, Mineral, Gem, Rock and Fossil Show in Tucson, Arizona.

Misidentification of Mosquitoes in Amber and Copal

Most pieces of amber and copal with inclusions sold as mosquitoes are not actually mosquitoes. The majority of insects misidentified and sold as mosquitoes are usually: aquatic midges, fungus gnats, wood gnats, gall midges, biting midges, dance flies, and crane flies.

Correctly Identifying Mosquitoes [by T. M. Allen]

Four key characteristics are used to identify mosquitoes:

1) Mosquitoes possess a long piercing-sucking proboscis;

2) Mosquitoes have extremely long slender or spindly legs;

3) Mosquitoes possess two long filiform antennae made up of 14-15 segments, at least half as long and can be just as long as the proboscis; and

4) Mosquitoes possess one pair of wings. These two slender wings possess scales along the wing veins. In flight, they create a high pitch "buzz."

Can dinosaurs actually be cloned from (dinosaur) blood found in the digestive system of a preserved mosquito in amber? See online at **www.MetaGuides.net/Articles** and read the full story, ***"Finding Mosquitoes in Amber, Copal and Copalite."***

FINDING MOSQUITOES IN AMBER, COPAL and COPALITE

A General Investigation of known Mosquito Inclusions

Research and Commentary Identifying Mosquitoes in Amber, Copal and Copalite conducted by: Terrance M. Allen, S.C.E. – State Certified Entomologist, Retired.

Entomologist, Arachnologist, Practicing Paleoentomologist, Factotum Naturalist .

November 8, 2015.

Terrance M. Allen, Sacramento, California
Entomologist, Arachnologist, Practicing Paleoentomologist, and Factotum Naturalist; In his home laboratory with 50k insects, spiders, and related arthropods, and over 2k fossils.
Photo by Don Meuchel, May 21, 2014

History Summary for Terrance M. Allen includes:

Northwestern School of Taxidermy: Certificate & Diploma in completion of the Study of Taxidermy.

Long Beach City College and **California State University Long Beach:** Associate in Science and Bachelor of Arts Degrees with a Major in Entomology.

State of California Dept. of Health: Certified Technician in Mosquito Control.

California State Dept. of Food and Agriculture: Certified as Economic Entomologist and Pest Management Specialist.

Inventor: Insect Collecting Allen Aspirator, Fruit Fly (Medfly) Fruit Collection/Detection Stacking Bucket, Intense-Biased-Survey Medfly Detection Program. ✦