tend to only live a week or two while female mosquitoes can live for up to a month and produce multiple batches of eggs. Some mosquito species overwinter as blood-fed females and can survive for multiple months.

Funding

Provided by the U.S. Environmental Protection Agency, Region VI Office, Dallas, Texas.

Authors

Dr. Don L. Renchie (Extension Program Leader for Agricultural and Environmental Safety, Coordinator-Pesticide Safety Education Project (PSEP), Assistant Professor and Extension Specialist); Dr. Mark Johnsen (Extension Assistant, Agricultural and Environmental Safety); and Ples Spradley (Associate Professor-Pesticide Education, Department of Plant Pathology-Extension, University of Arkansas Division of Agriculture)

Date of Publication

June, 2007

AG1163

Cooperative Extension Service, University of Arkansas, United States Department of Agriculture, and County Governments Cooperating.

Printed by University of Arkansas Cooperative Extension Service Printing Services.

AgriLIFE EXTENSION
Texas A&M System

LSU AgCenter Research & Extension

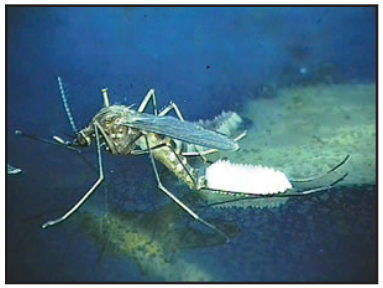
NM STATE

UofA UNIVERSITY OF ARKANSAS DIVISION OF AGRICULTURE

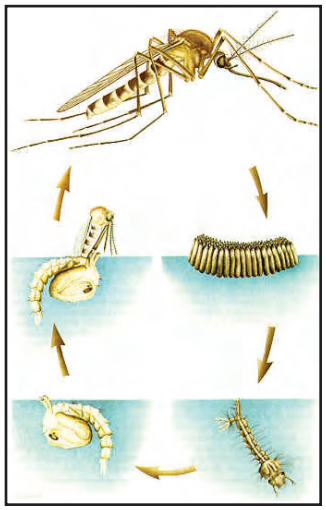
OKLAHOMA COOPERATIVE EXTENSION SERVICE

Mosquito Life Cycle

Mosquitoes are most often thought of as blood-thirsty pests that spread disease and ruin our outdoor activities. However, the majority of the mosquito's life cycle is spent in the water, and it is only the adult stage that adversely affects human and animal health. This knowledge offers us points in their life cycle to initiate control before they can reach the adult stage. Each stage in the mosquito life cycle has diverse morphology (how they look), but they all follow a general life cycle which has been described in detail in this handout.

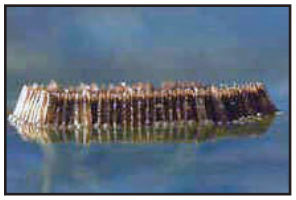


The Stages of the Life Cycle of Mosquitoes



All mosquitoes go through four distinct stages (egg-larvae-pupa-adult) in their life cycle which can vary in length depending on temperature and food resources. In the summertime it takes mosquitoes 3-10 days to totally complete their life cycle from egg to adult.

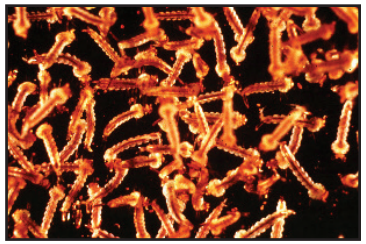
EGG STAGE



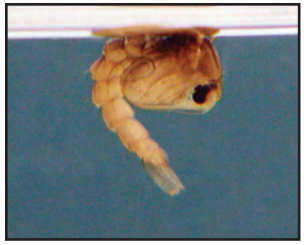
Mosquito species are broken into two categories based on where in the environment they lay their eggs. **Floodwater mosquito** species lay their eggs above the water level in areas that are prone to periodic flooding. These oviposition (egg laying) sites range from cattle hoof prints to empty soda cans. The eggs from these mosquito species can persist in the environment for 3 months to 2 years and is the stage used to survive the winter. **Standing water mosquito** species lay their eggs on the surface of transient and permanent pools of water. Some species lay their eggs singly while others glue 100-200 eggs together forming miniature rafts. Within 24-48 hours these eggs will hatch in the environment.

LARVAL STAGE

Once hatched, mosquito larvae (or wigglers) go through four instars (time period between molts), increasing in size after each molt. The larval stage displays a great variation in morphology between the mosquito species and is used for identification purposes. Most mosquito species feed by filtering microorganisms (bacteria, protozoa, fungi) out of the water, but there are several predaceous species that feed on other mosquito larvae.



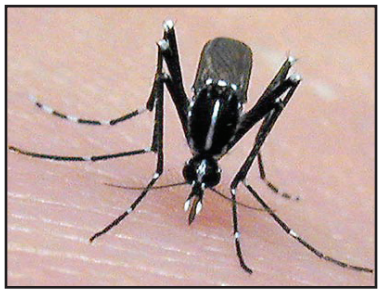
Larvae must breathe atmospheric oxygen and will lay horizontal (only *Anopheles* spp.) or 45 degrees to the water surface. Some species have the capability of puncturing underwater plant cells to receive oxygen and never have to surface.



PUPAL STAGE

The fourth instar larvae molts into the comma-shaped stage called the pupa (or tumblers). This is the transition stage between the aquatic stages of the mosquito's life cycle and the terrestrial adult stage. Mosquito pupae do not feed but are mobile and use a tumbling motion to escape predation. Within 24-48 hours the pupa will molt into an adult.

ADULT STAGE



After the adult mosquito emerges, it seeks a protective environment in the surrounding vegetation to allow its wings to complete development. Male mosquitoes tend to emerge prior to the female mosquito and will mate with the female as soon as she is capable. Female and male mosquitoes both require carbohydrate sources (nectar, plant exudates) throughout their life to maintain energy for flying, mating, and seeking hosts for blood meals. Only the female mosquito takes a blood meal because she needs the extra protein to develop eggs. The process of taking a blood meal is how the mosquito is able to vector viruses, protozoans, and helminthes (worms) to humans and animals. Male mosquitoes