

Rural Training Center – Thailand (RTC-TH)

REEEPP FOCUS

An innovative, non-traditional community-based environmental education program integrating math, science, geography, English language, and technology lessons for environmental stewardship using interactive experiential learning in outdoor settings at Ban Na Fa Elementary School, Nan Province, Thailand.



LEARNING ABOUT MOSQUITOES



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Created by G.K.
Lee for the RTC-
TH REEPP



This is an English Language Training module of **REEEPP**

Rural Environmental Education Enhancement Pilot Program
presented by
The Rural Training Center-Thailand



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www.neighborhoodlink.com/org/rtct

Mosquitoes are flying insects.



They can fly about 1.5-2.5 kilometers per hour.



Mosquitoes are flying insects.

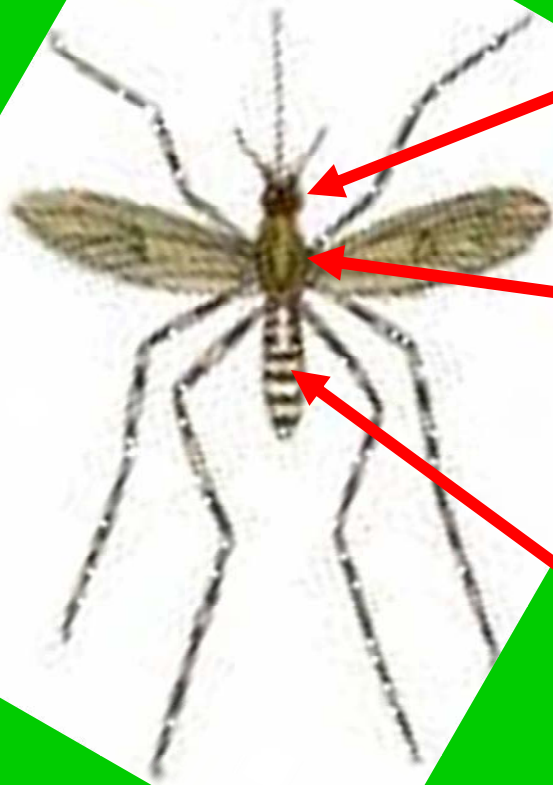


They can fly about 1.5-2.5 kilometers per hour.



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Insects have a body made with 3 segments.



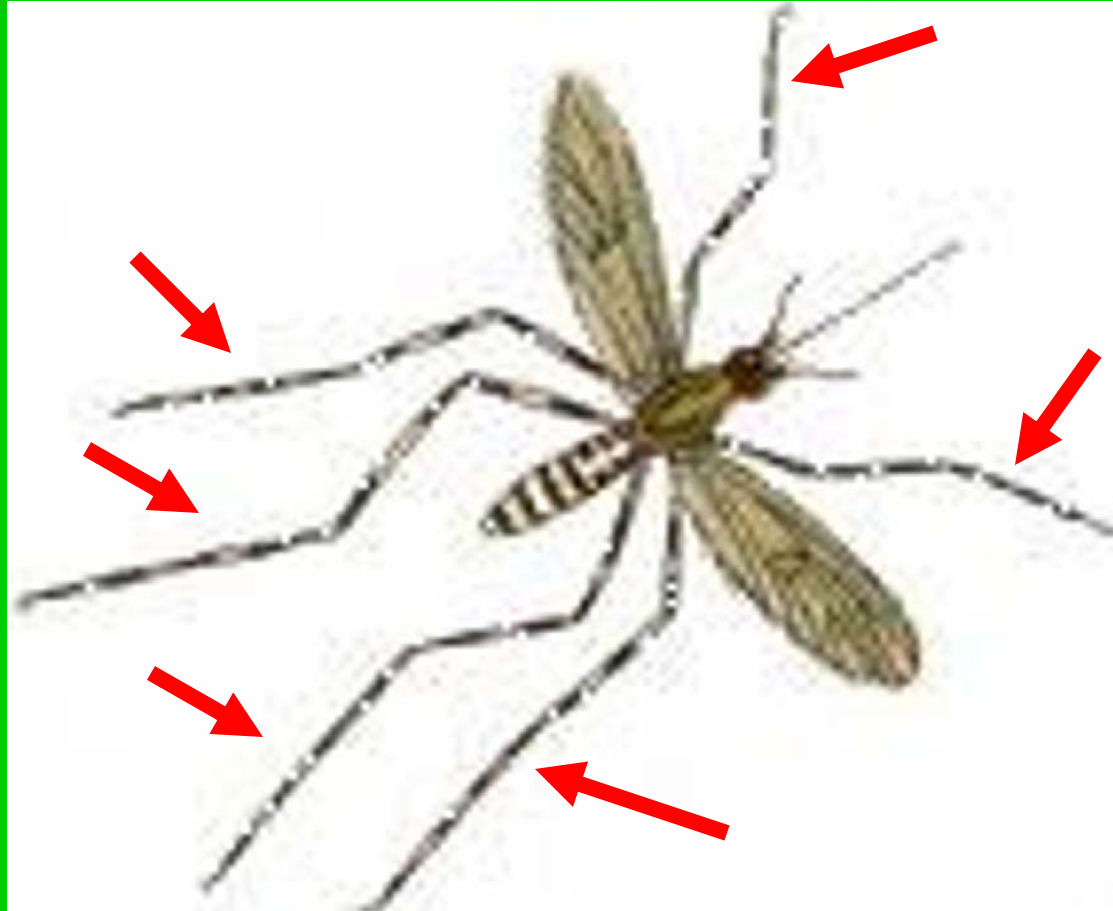
Head: used for finding food, eating and finding a mate.

Thorax: used for movement (legs and wings are connected here).

Abdomen: digestion and reproduction

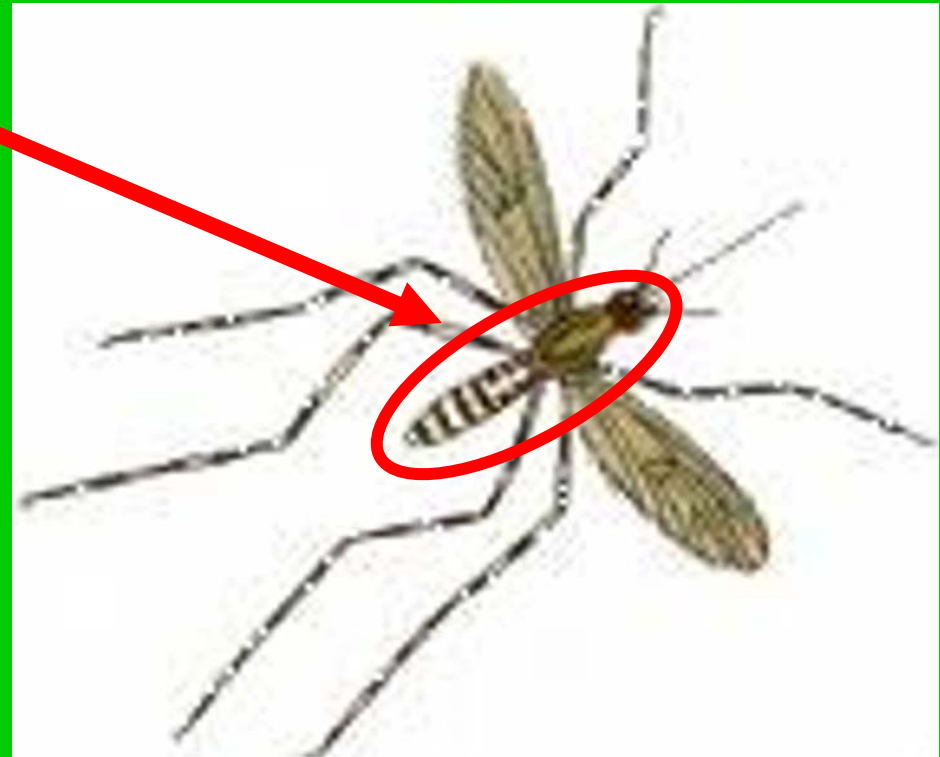


Insects have 6 legs.



Insects have a hard “shell” called an exoskeleton.

An
“exoskeleton”
means an
insect has no
bones inside its
body. Instead
it has the hard
part of its body
on the outside.



Animals with exoskeletons must shed their
exoskeleton and get a new one in order to
grow bigger.



Mosquitoes have different life stages.

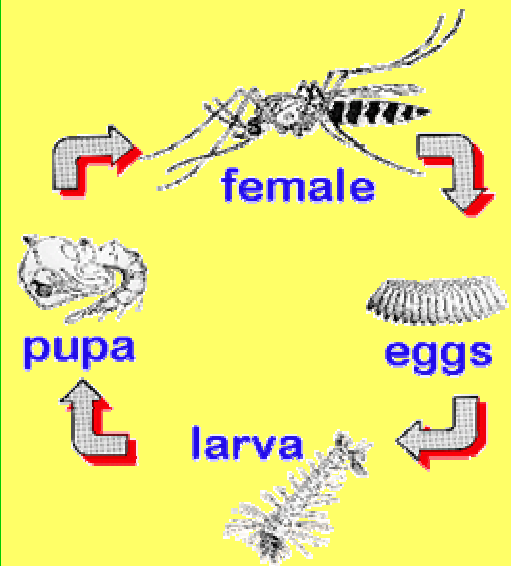
Egg: Depending on the temperature, the eggs hatch in about 2-3 days.

Larva: There are 4 stages of larval growth.

Pupa: It takes a few days for the adult to emerge.

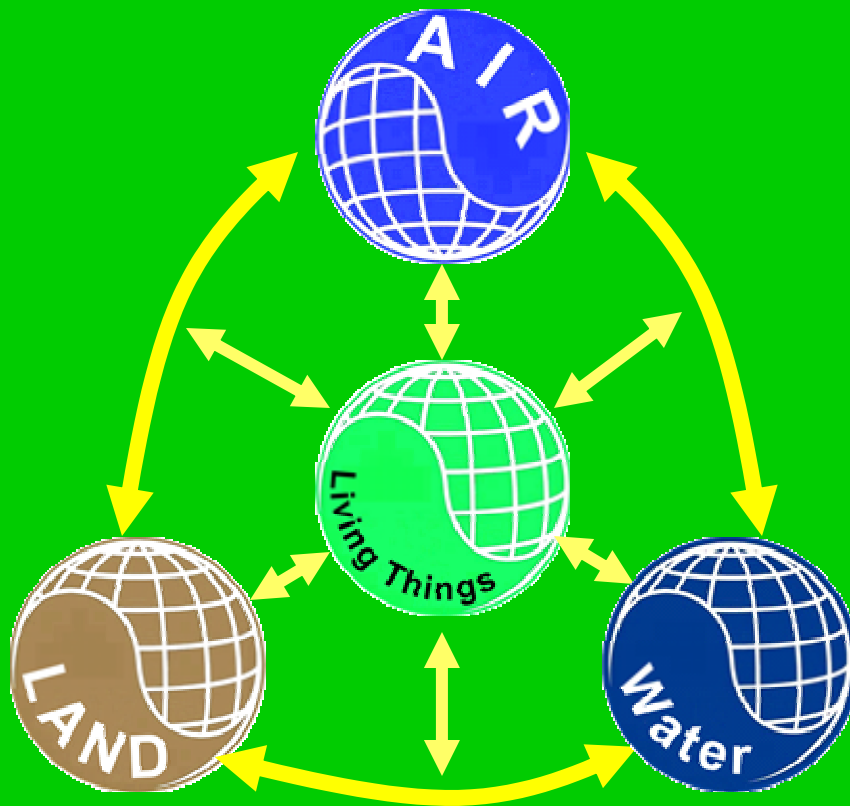
Adult: In captivity, adults live about 1 month. In the wild, adults live 1-2 weeks.

It takes about 5-14 days for a mosquito to go from egg to adult (depending on the temperature and mosquito species).



What is the habitat for mosquitoes?

Location Scale Time

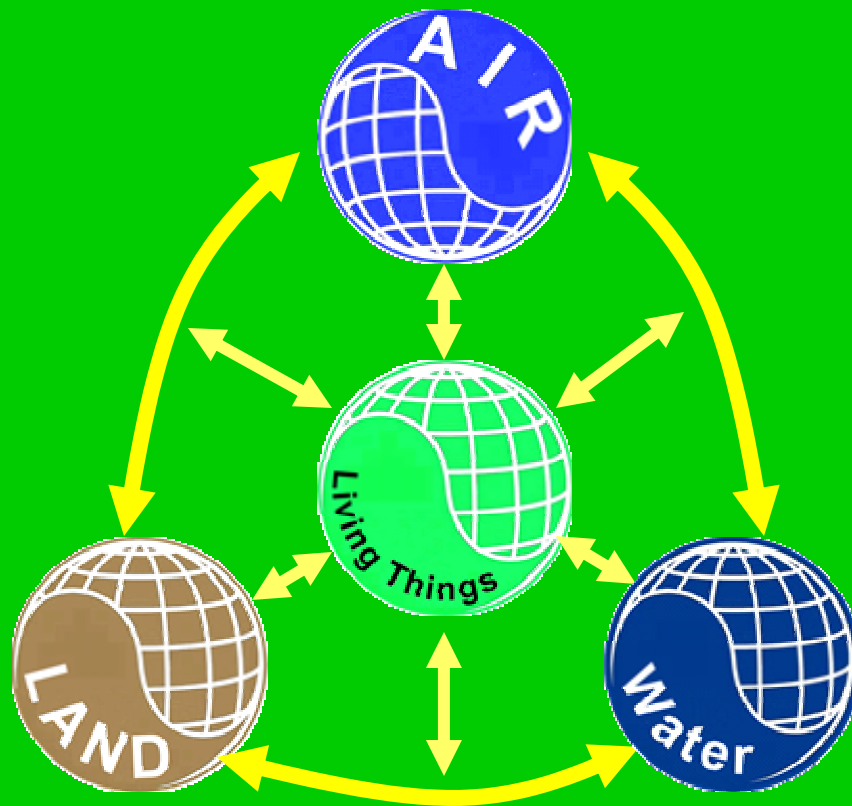


You can use the Geographic Systems Model to learn about the habitat of mosquitoes.



Mosquito Habitat

Location Scale Time



Mosquitoes
need
space,
water,
food, and
shelter.



Location

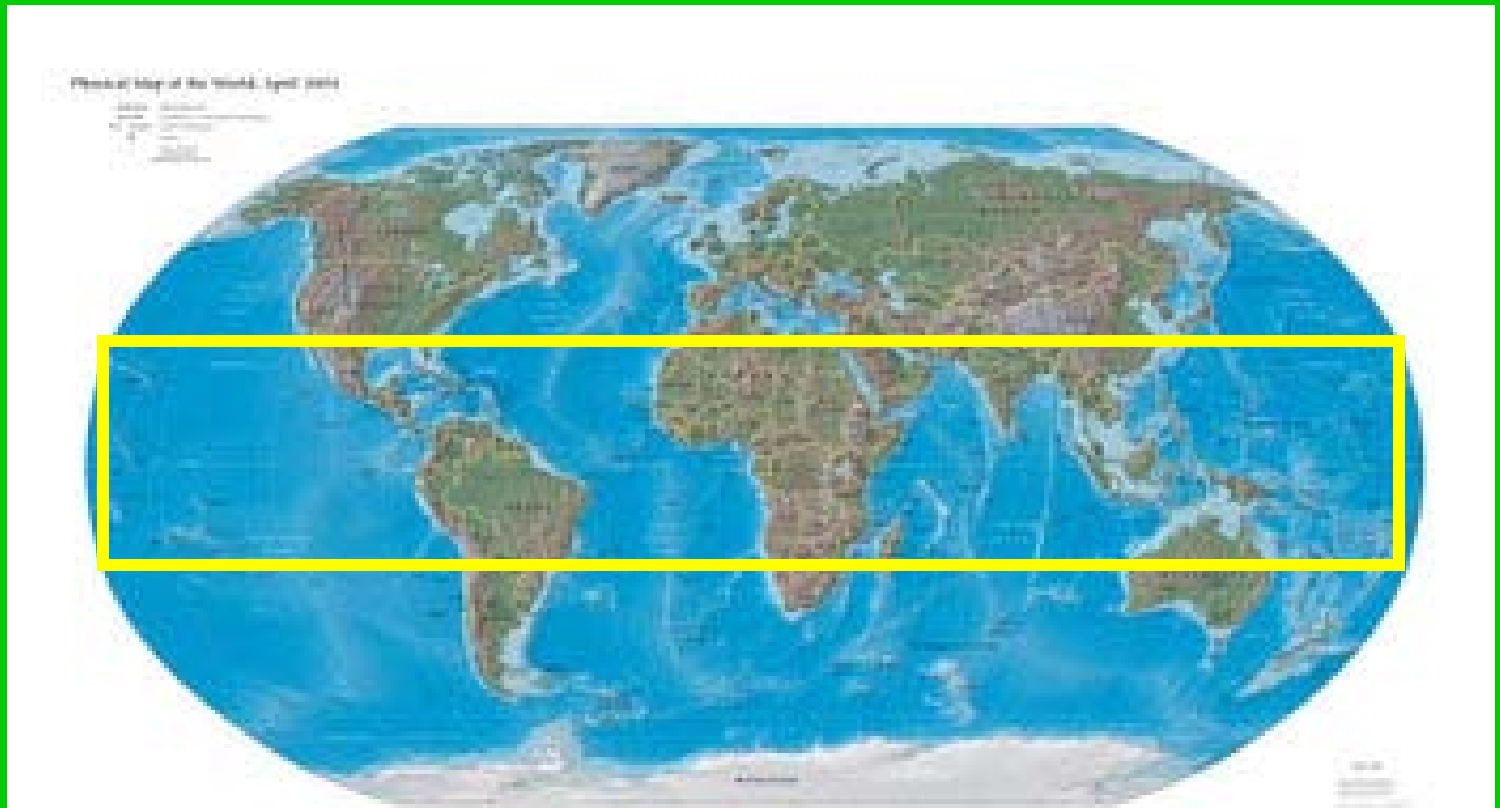
Mosquitoes can be found over most of the world.



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Scale

Mosquitoes need water for the first part of their life.
The adults cannot tolerate very cold temperatures.



Their need for water and warmer temperatures sets limits on their year round world distribution. Outside this zone, mosquitoes are more seasonal.



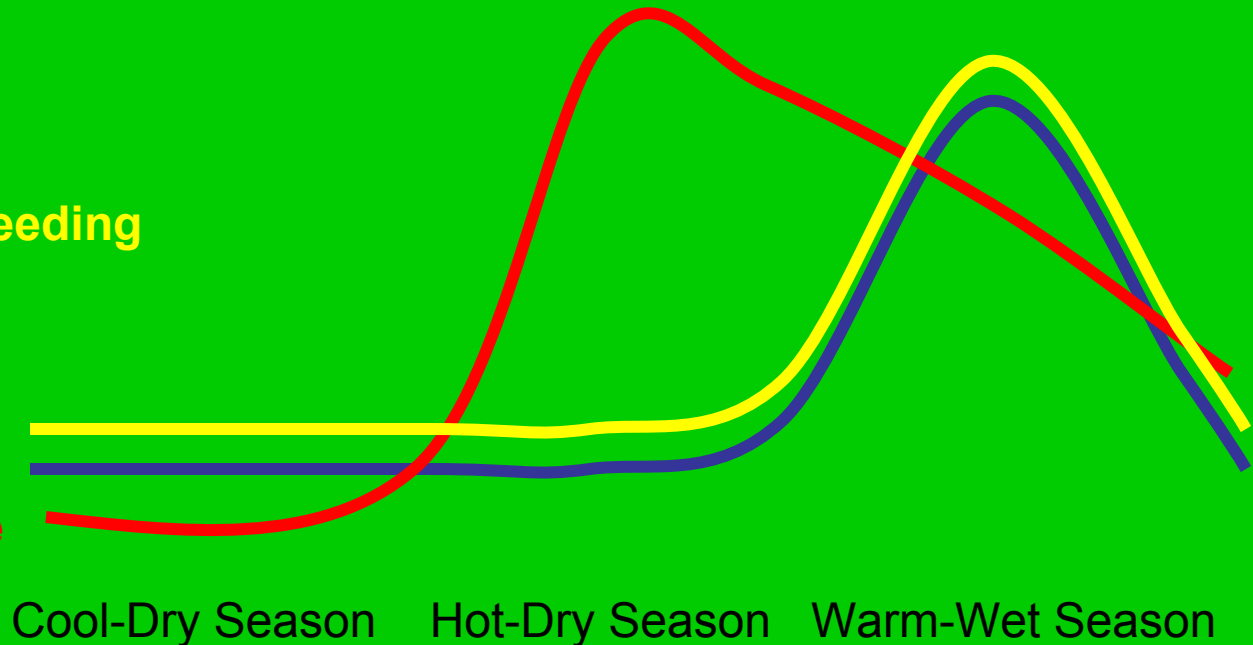
Time

There are more mosquitoes in the warm, rainy season in Thailand. But mosquitoes exist year round.

Mosquito breeding

Rainfall

Temperature



In the wild, adult mosquitoes may live about 1-2 weeks.

Mosquitoes need air.

- They breathe air (even in the water stages of their lives).
- They fly in the air to get from one place to another, to get food, and to mate.



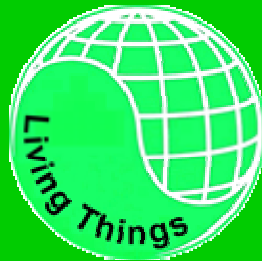
Mosquitoes need water.

- They drink water.
- They lay eggs in water.
- Mosquitoes begin their life in water. They find food and shelter in the water.



Mosquitoes need land.

- The water used by mosquitoes is on land or close to the coast.
- Land is home to most of the plants and animals mosquitoes use for food.



Mosquitoes, plants and animals.

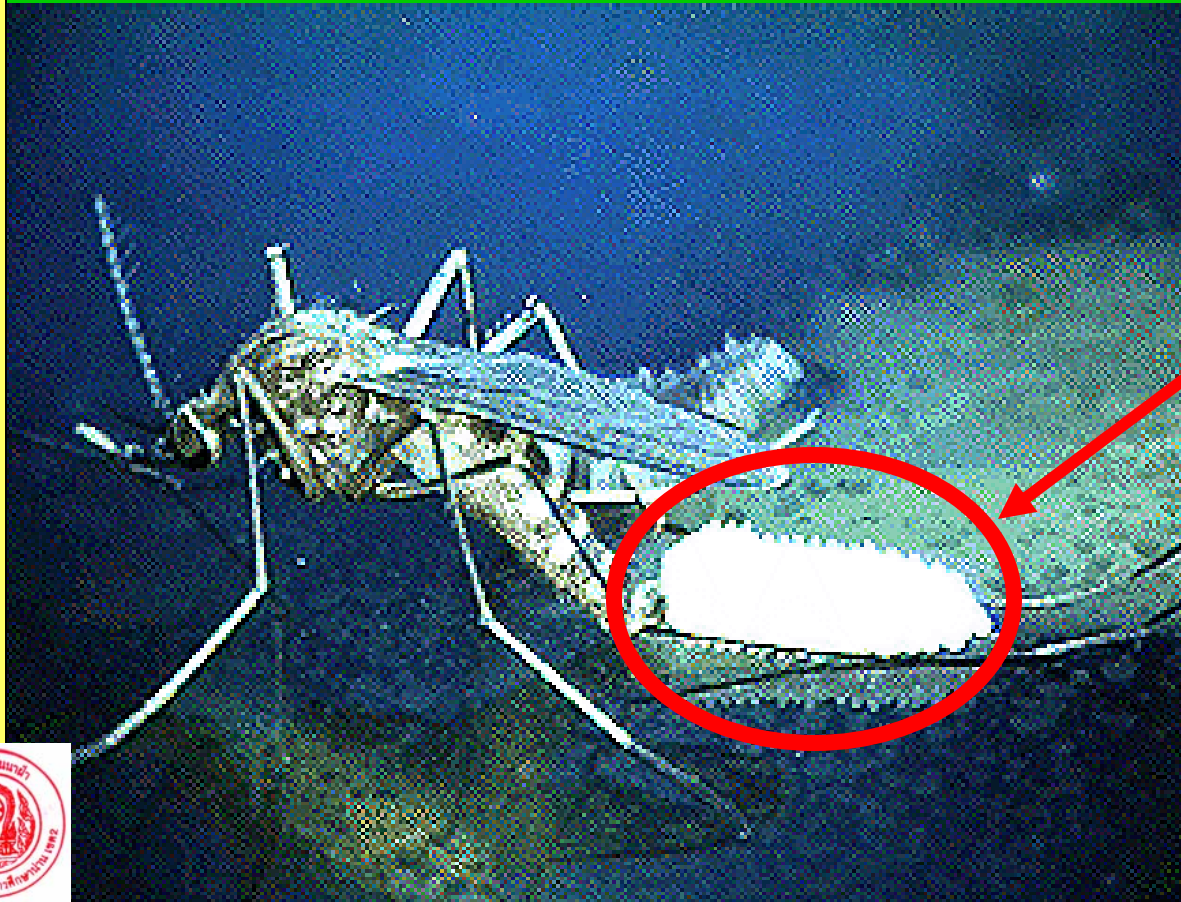
- Mosquitoes drink nectar from plants.

- To lay eggs, female mosquitoes need blood from live vertebrate animals.

- Plants give adult mosquitoes food and shelter.



Stage 1: A mosquito's life begins in water.



A mother mosquito lays eggs in water.

If the temperature is just right, the eggs can hatch in 2-3 days.



Water and Mosquitoes.

Some people think mosquitoes lay their eggs in clean water. Others think dirty water is needed. But any water will do.



There are many different species of mosquitoes. Some have adapted to very different habitats including salt water, fast flowing water, and muddy water.



Mosquitoes are clever.

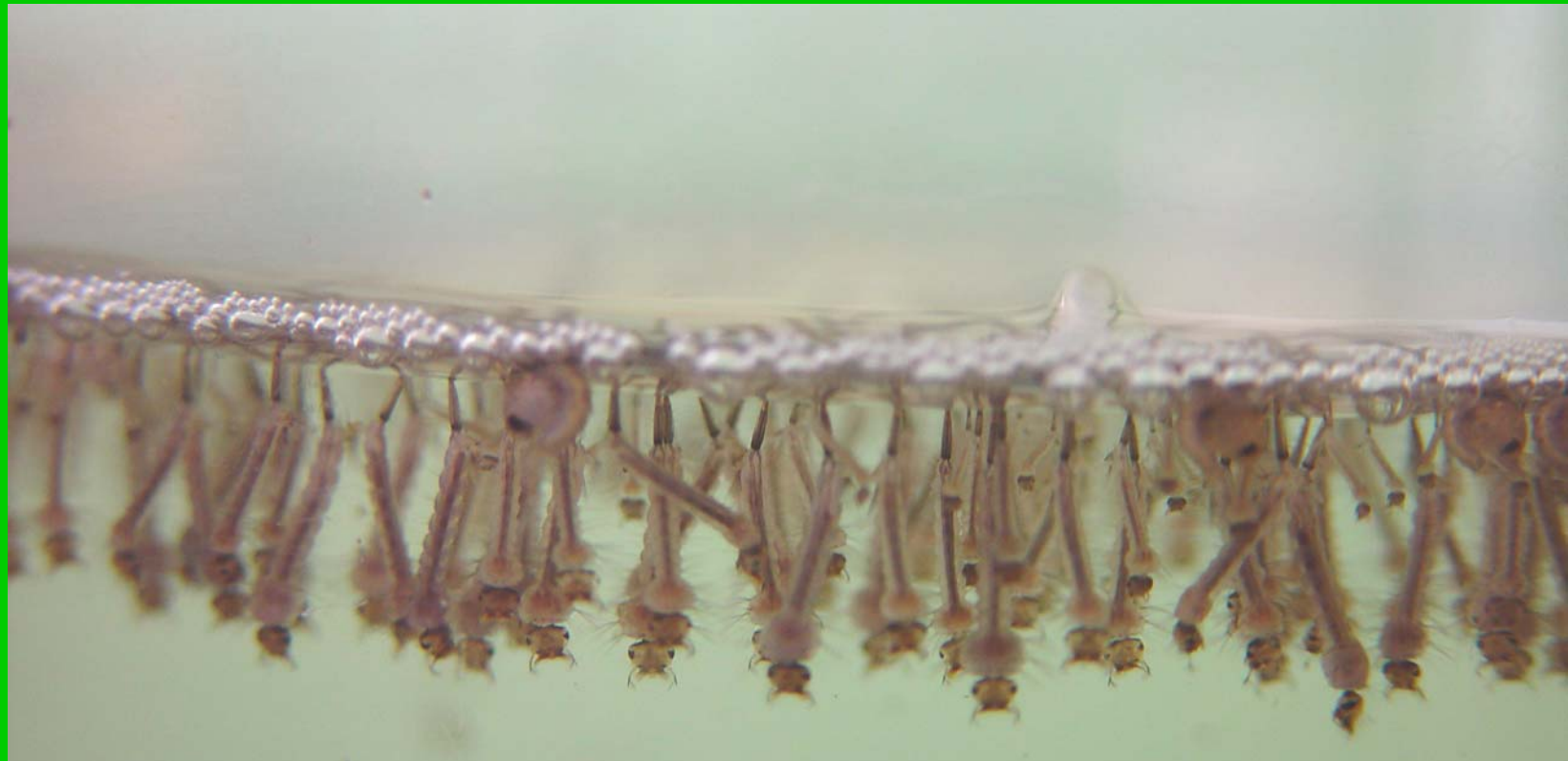
Mosquitoes living in cities and towns can lay eggs in water in flower vases. Some mosquitoes can even lay their eggs in moist soil and don't need much water at all.



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Stage 2: Mosquito Larva

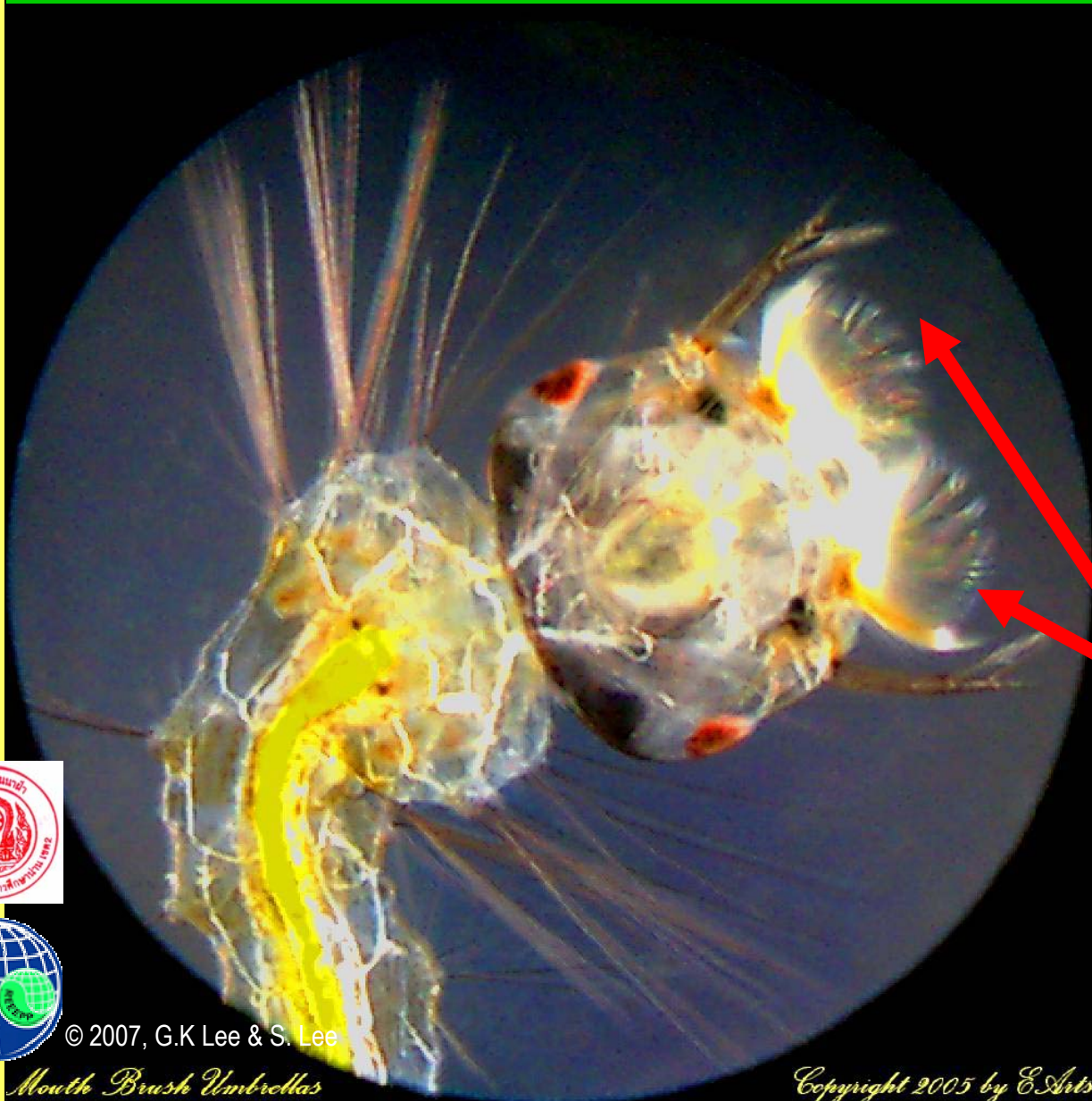
When a mosquito egg hatches, a larva comes out.



Larva is a singular noun. The plural of larva is larvae.



Mosquito larvae live in water.



They filter small small pieces of food from the water using the brush-like mouth parts.

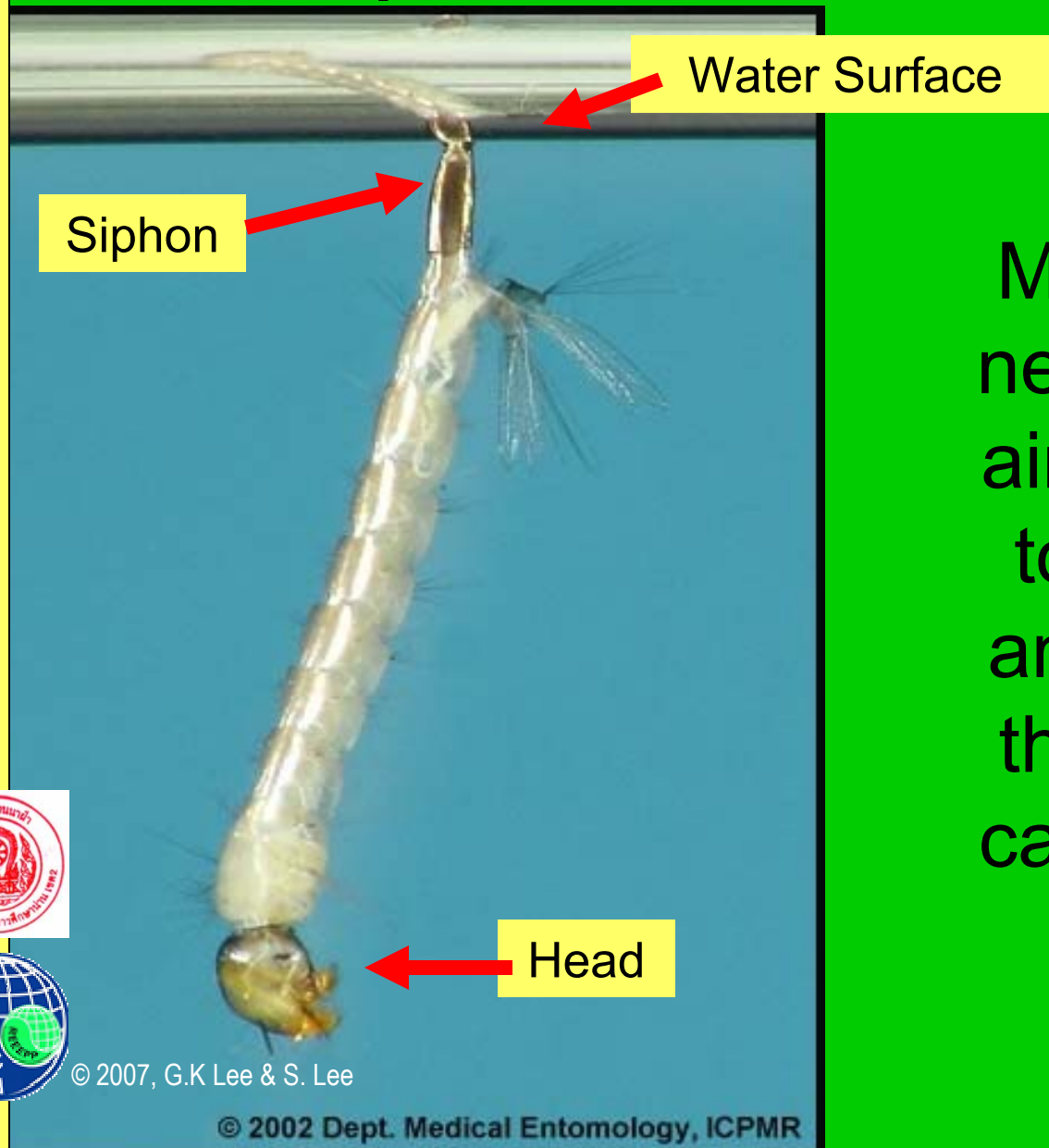


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Mouth Brush Umbrellas

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Mosquito larvae live in water.



Mosquito larva need to breathe air. They come to the surface and breathe air through a tube called a siphon.

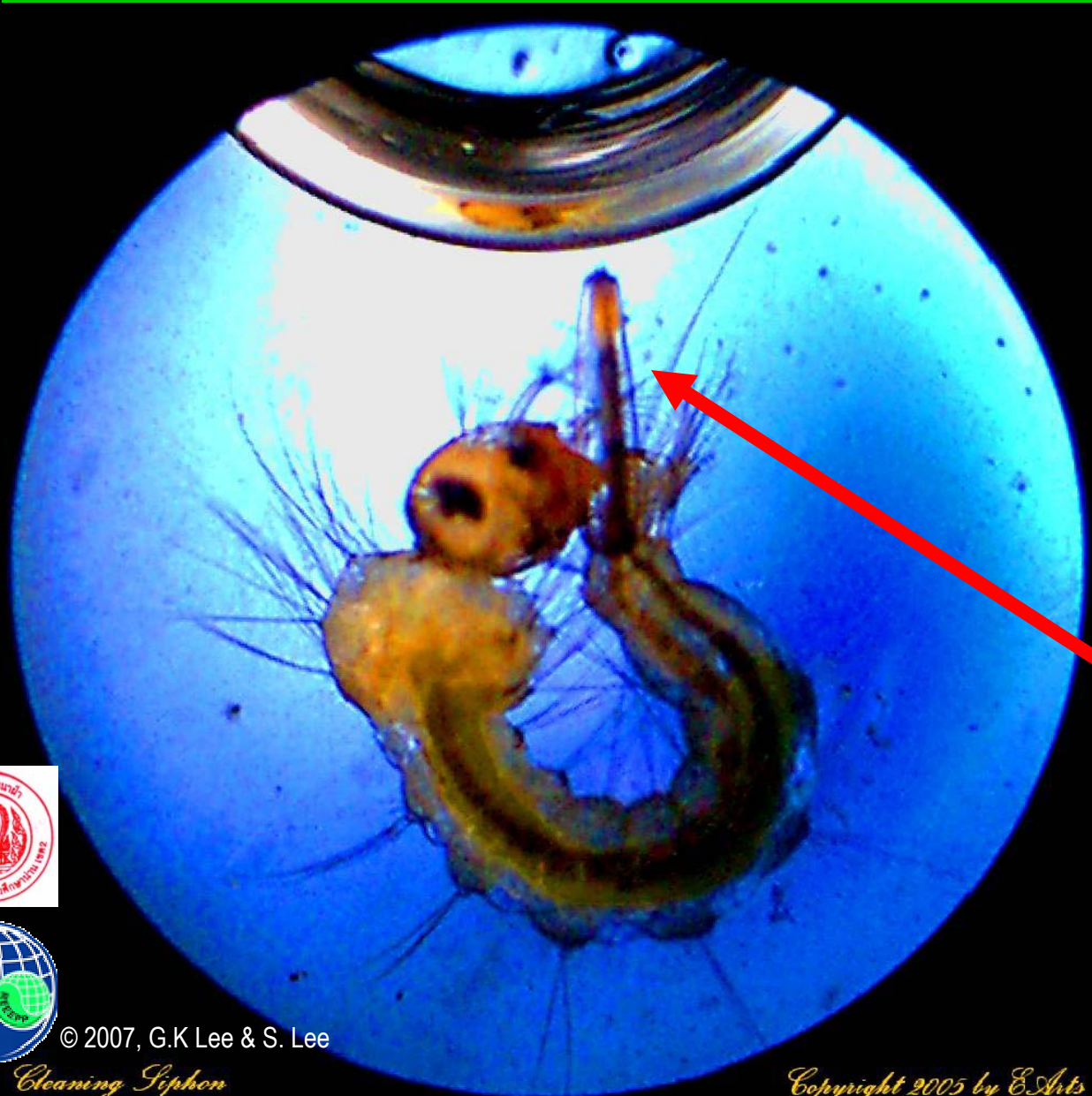


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Larvae must keep their air tube clean.

The air tube on the mosquito larva is called a siphon.



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Cleaning Siphon

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The larvae grow larger.

There are 4 stages of larval growth.

The larvae must shed their exoskeletons each time they complete a growth stage.



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Older mosquito larvae are bottom feeders.

This is where they can find larger pieces of food. But they still go to the surface for air.



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Angel of Death Feeding

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Stage 3: Metamorphosis begins.

When the
mosquito larvae
are big enough,
they enter the
next stage of life.
They become
pupae.

Pupa is a singular noun.
Pupae is the plural form.



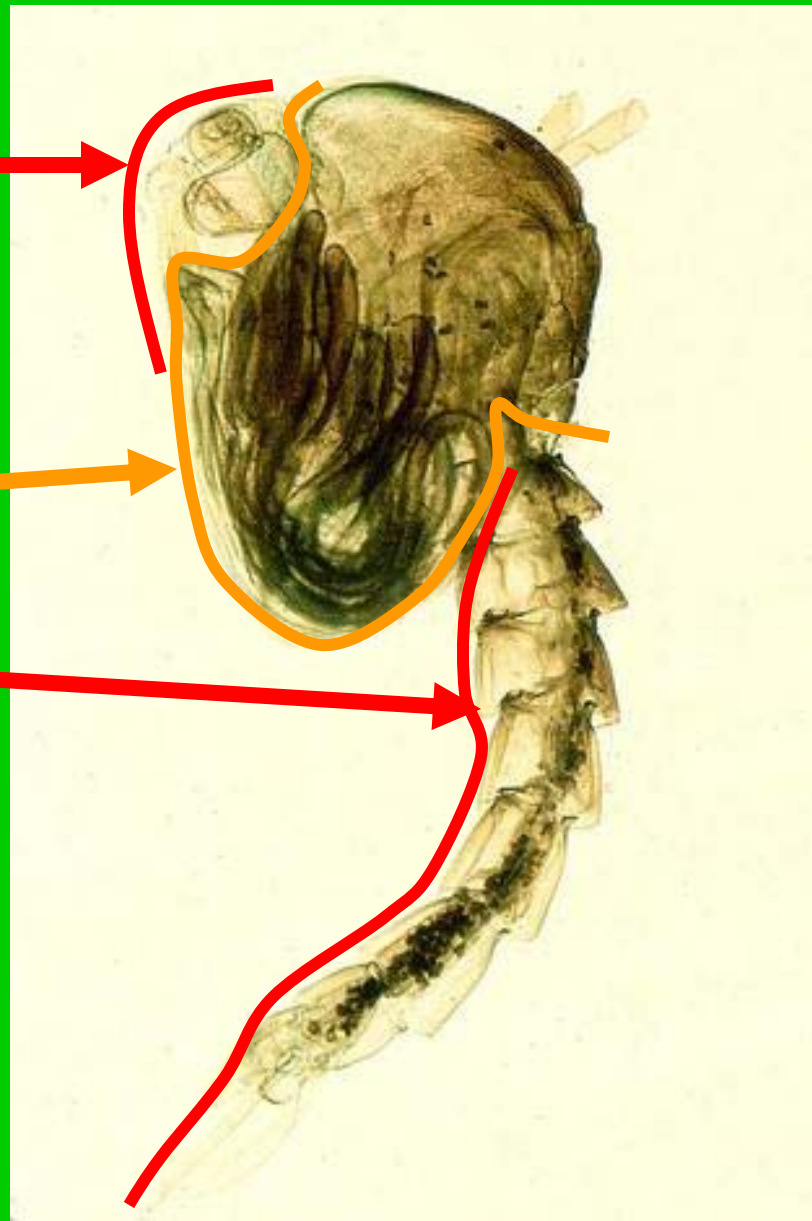
Adult Features Appear

You can
see
many
adult
features
in the
pupa.

Head with
antenna and
proboscis

Thorax with
legs

Abdomen



Stage 3: Metamorphosis begins.

The adult mosquito will come out of the pupa in a few days.



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Stage 4: The Adult Mosquito

The mosquito moves from a water life to a life in the air.



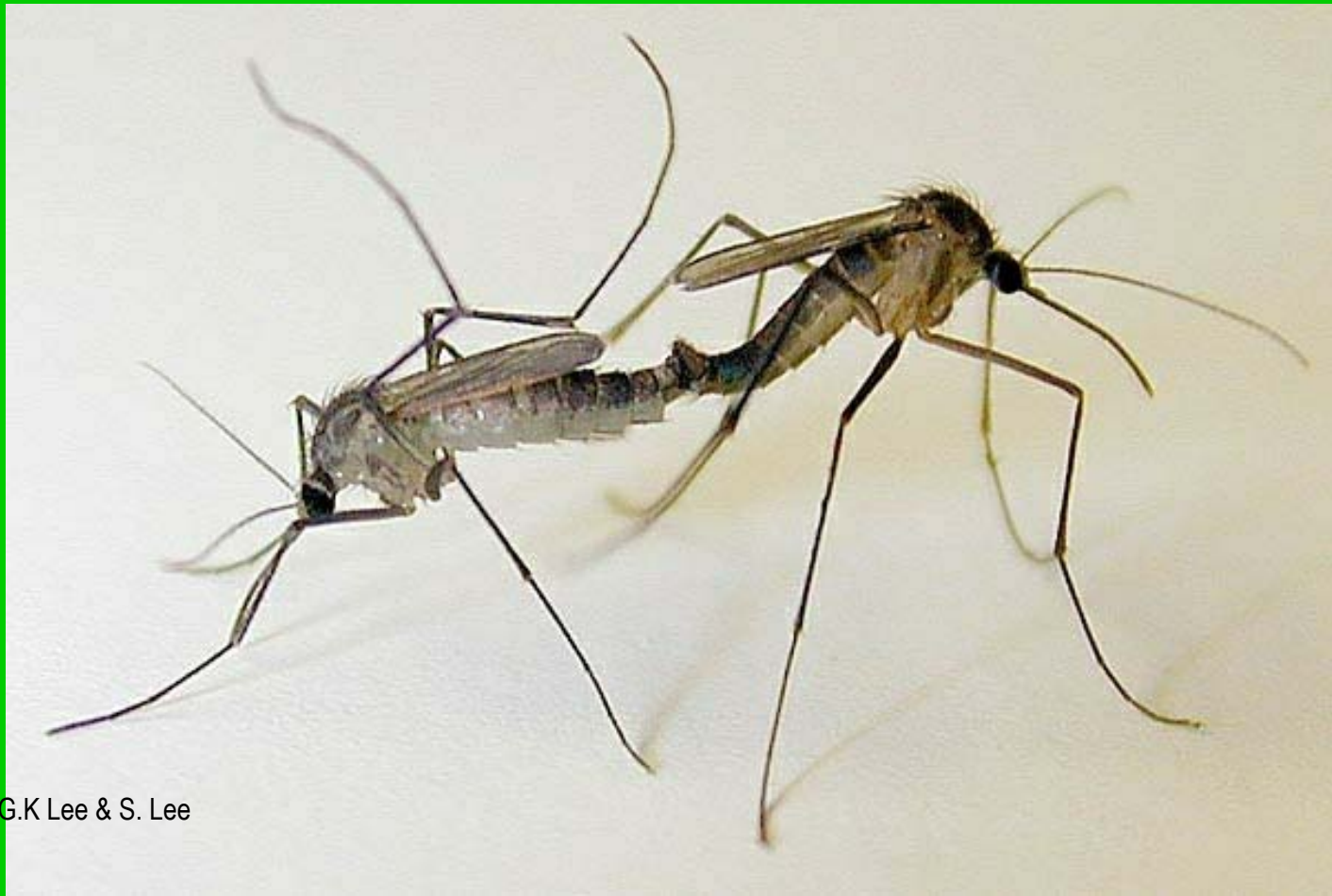
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Adult mosquitoes mate to make more mosquitoes.

They “sing” by beating of their wings. When their “singing” matches, the mosquitoes found their mate.



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Some differences between male and female mosquitoes.

characteristic	Male	Female
Antennae	Fuzzy	Plain
“Singing”	Yes	Yes
Biting	No	Yes

But the “singing” is different.



Male Mosquito



Fuzzy
antennae



Female Mosquito



Plain
antennae



Mosquito Reproduction

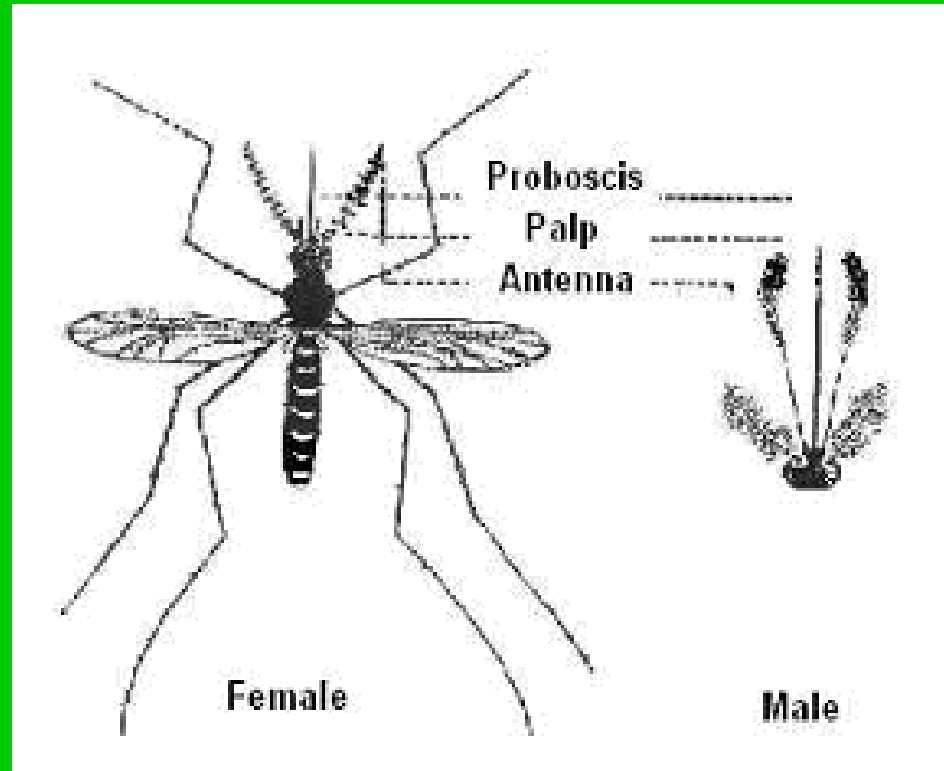
A female mosquito needs to mate only 1 time in her life. Then, in order to lay eggs, she must get blood from a live vertebrate animal.



The animal the mosquito feeds on is called a “host” or “blood host”.



How do mosquitoes find you?



Mosquitoes use sight, “smell” to detect the carbon dioxide given out when animals breathe, and heat. The antenna are the main sensors. Mosquitoes can find you from about 33 m away.



If a male finds you, he “sings” to attract a female.

A male mosquito
doesn't bite you.
But the sound is
disturbing.
Remember, males
feed on plant
nectar.



After mating, the female needs a blood meal in order to lay eggs.

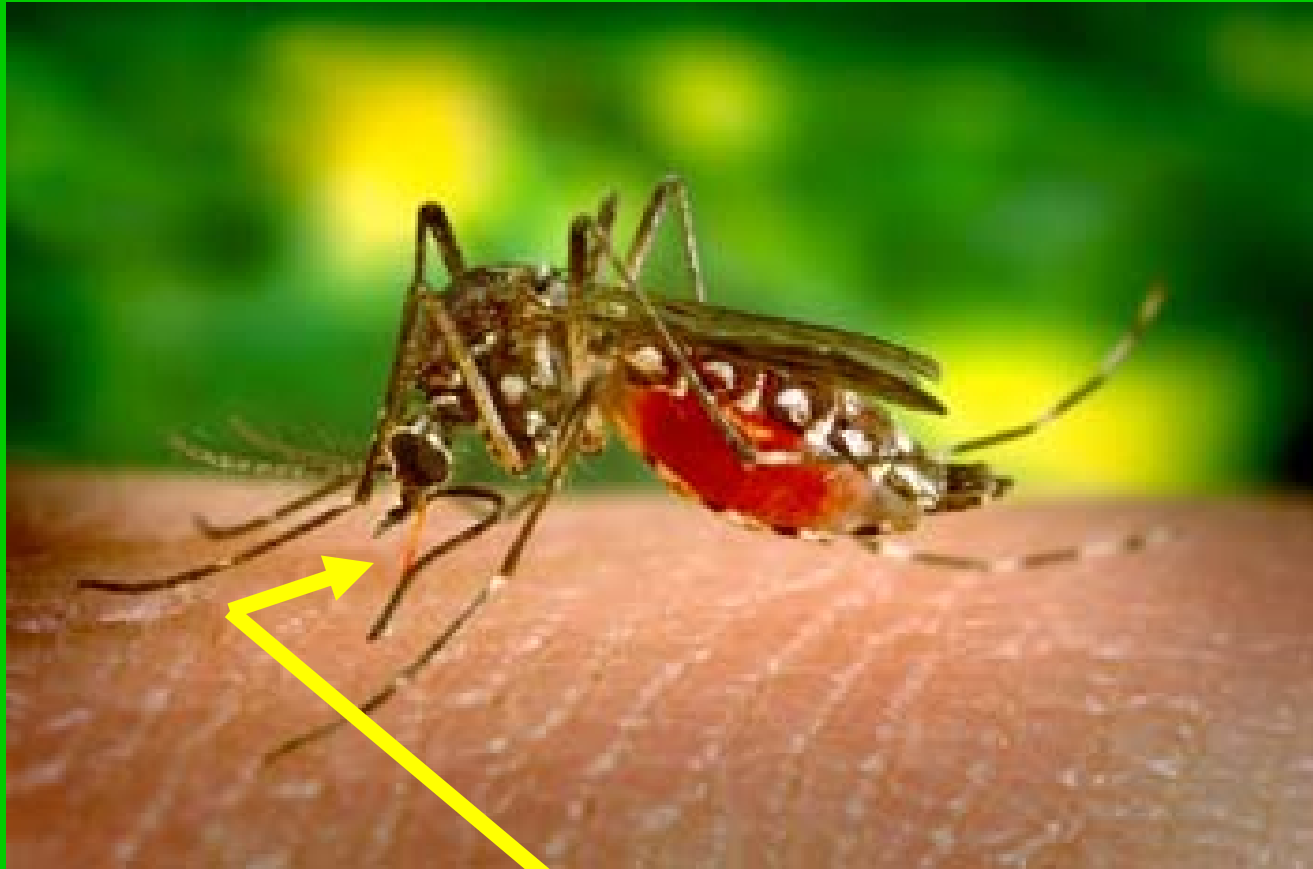


Proteins in the blood meal help the eggs develop in the mother mosquito before she can lay them in water.



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When a female “bites” you, they don’t really bite.



They insert a needle-like probe into you. They do this in about 30 seconds to do.



Mosquitoes don't suck your blood.



Your heart beat pumps the blood into the mosquito. The mosquito is full in about 2 ½ minutes.



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Female mosquitoes inject saliva and a chemical to keep your blood from clotting.



This is why your blood flows easily into the mosquito.



Your Reaction to a Bite

The saliva from a mosquito is a “foreign” substance in your body. Your body’s chemical defense system reacts to the mosquito saliva. This causes the itching and the bump or welt in your skin.



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After the “Blood Meal”: Rest and Digest

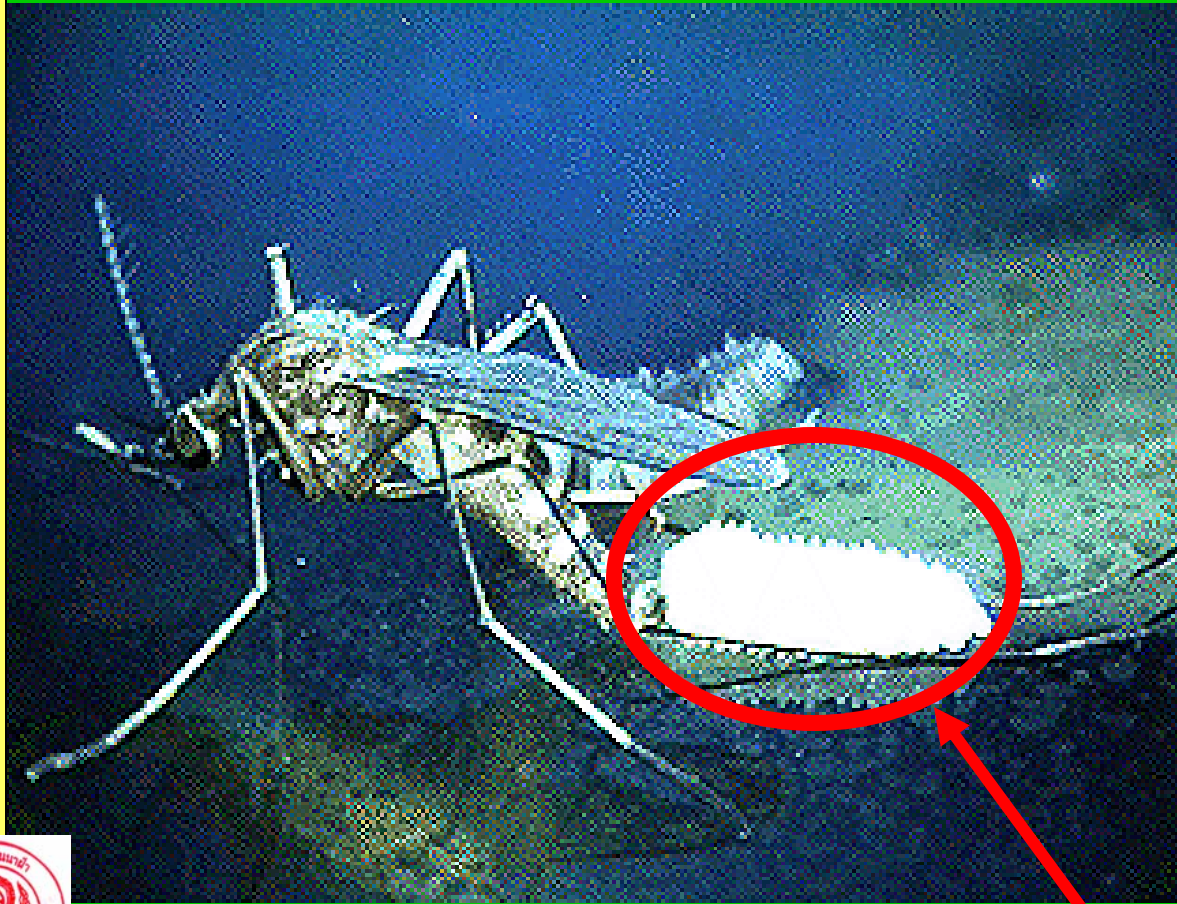


The female mosquito will rest a few days. The eggs need time to develop before she can lay them in water.



Find Water for Egg Laying.

A mosquito must find suitable water in which to lay the eggs. Different mosquito species seek different water conditions.



A mother mosquito lays eggs in water. The cluster of eggs is called an egg raft.



Mosquito eggs have a very hard, tight shell.



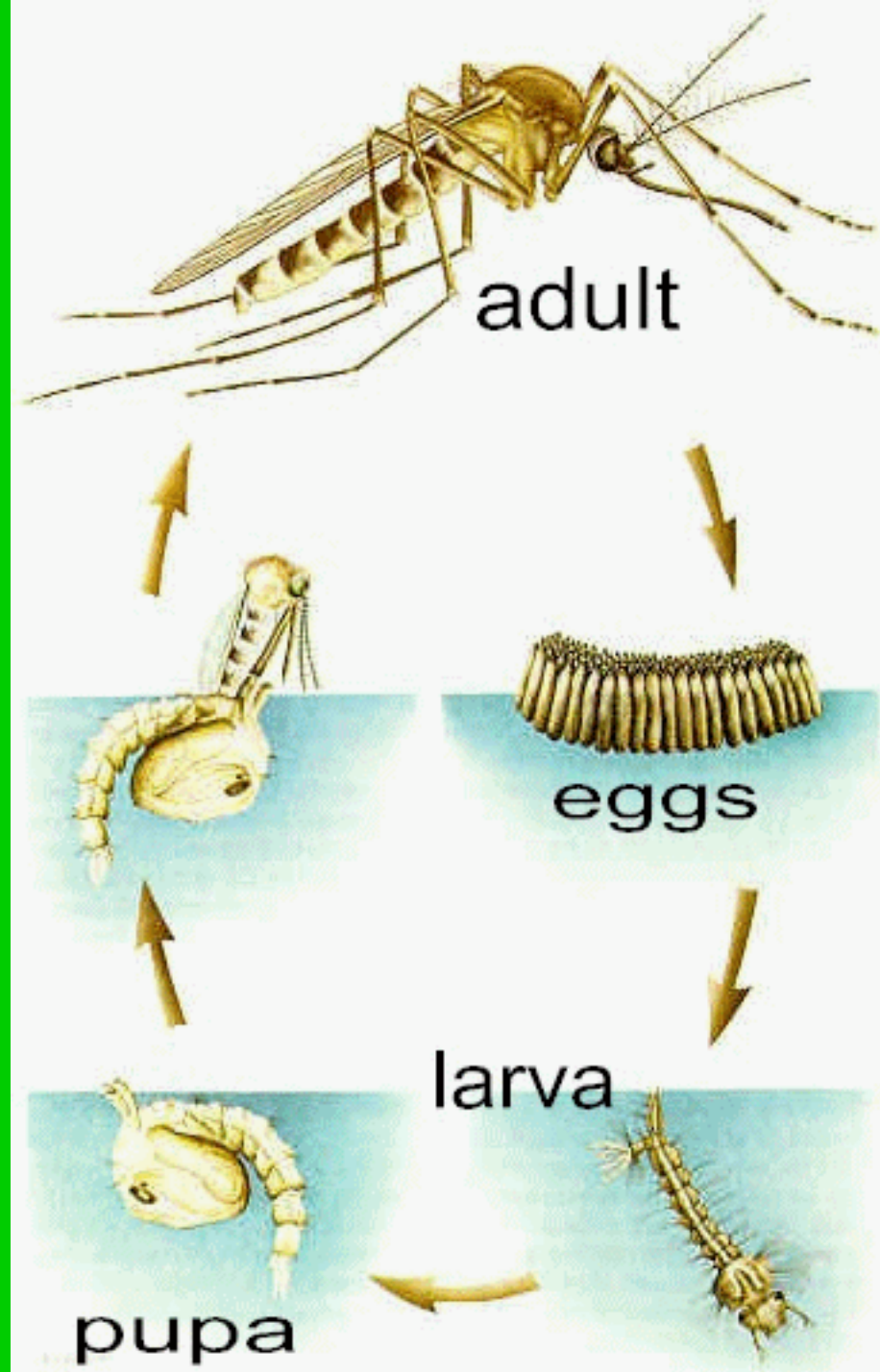
If the water dries up before the eggs hatch, the eggs can incubate for 7 years .



When water is available and at the right temperature, the eggs can hatch .



The larvae will develop to pupae, then to adults. The cycle repeats again and again. This way, Thailand won't run out of mosquitoes.



Mosquitoes can carry diseases.



Dengue fever and malaria are two dangerous disease carried by mosquitoes in Thailand.



You can get these diseases if an infected mosquito bites you.

- Malaria
- Dengue Fever
- Yellow Fever
- West Nile Disease

There is another lesson about protecting yourself from mosquitoes.



Dengue Fever Mosquito.



Aedes aegypti is the mosquito that carries dengue fever. It is an urban mosquito. It lives in cities and around human dwellings. They tend to feed during the daytime.



Malaria Mosquitoes in Thailand.

There are 3 species of mosquitoes known to carry malaria to humans in Thailand. They tend to feed at dawn and dusk:

- *Anopheles maculatus* s.s.
- *Anopheles minimus* s. l.
- *Anopheles aconitus*

The malaria in Thailand is mostly in rural areas on the border of Burma and Cambodia (along the sea coast.)



Now you know something about mosquitoes. Use this knowledge to protect stop mosquitoes from breeding near your house.

- They are flying insects.
- They need water to lay eggs to make more mosquitoes.
- Females need to get blood to lay eggs.

There is another lesson about reducing mosquitoes around your home.



RTC-TH

Rural Training Center-Thailand



is dedicated to providing
community-based
environmental education
for the self-sufficiency
and sustainability of
small rural family farms





The RTC-TH was created to honor the memory of Mr. Tang Suttisan, a father, a farmer, and a man who valued education and used it in starting his family farm



REEEPP

Rural Environmental Education Enhancement Pilot Program



An innovative, non-traditional community-based environmental education program integrating math, science, geography, English language, and technology lessons for environmental stewardship using interactive experiential learning in outdoor settings at Ban Na Fa Elementary School, Nan Province, Thailand..



The End



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