

# Everything you've ever wanted to know about mosquitoes

If it is any consolation, less than half of all mosquitoes are after your blood. Firstly, males do not bite — that eliminates 50 per cent of the population; secondly, many mosquitoes specialize on birds, frogs, or even other blood-sucking flies but do not feed on humans; and thirdly, some species do not feed on blood at all. Still, the majority of female mosquitoes do require a blood meal for developing their eggs. Only a few species get enough food reserves from their immature stages or by other means,

such as digestion of their own wing muscles, to eliminate the need for blood.

## Life History

There are over 3,000 species of mosquitoes in the world; 160 in North America, 40 in Alberta. Even Hawaii has four — all introduced by ships and airplanes. All mosquitoes have basically the same life cycle: egg, larva, pupa, and adult.

Eggs are laid either singly or in rafts directly on water or in moist soil. A single female lays 75-500 eggs, depending upon the species and

its feeding history. Eggs may hatch nearly immediately or lay dormant for up to seven years.

This means that in certain years, weather conditions may induce hatching of eggs that have accumulated over several years. When eggs have the right moisture, temperature and light conditions, they hatch into wrigglers.

These aquatic larvae generally feed on bacteria and detritus. Most obtain their oxygen at the water's surface through siphons at the ends of their abdomens (this is

why oil was formerly poured on water bodies to kill mosquito larvae).

In a few species, larvae obtain oxygen indirectly by inserting their siphons into hollow plant stems. Within two three weeks, the larvae go through four stages or instars before they form pupae.

Thus some species can go through two or more lifecycles within one summer. Unlike most insects, mosquito pupae are active and are quite capable of swimming away from any disturbance.

Adults emerge from their



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## LIFE LONG LEARNING

pupal cases in a few days and fly off on their two, scale-covered wings. Most adults live only for a few weeks but some over-winter in this stage. These are the mosquitoes which we see in early spring.

Adult males and some females may feed on nectar of flowers or juice of fruits for an energy source. In doing the former, they pollinate many flowers, including several species of orchids. The males often form mating swarms that consist of several hundreds or thousands of individuals. The females are attracted primarily to the swarms by their shape. Males detect an incoming female by the difference in her wing beat frequency. Then,

in mid-air, a male will attach his abdomen to the tip of her abdomen with a pair of clasping organs before insemination. Most females then go off in search of a blood meal.

They find you because they are attracted to heat-emitting bodies, certain colours, and certain chemicals such as carbon dioxide (from your breathing) and lactic acid (in your sweat).

## Parasites

It is not the loss of a bit of blood that we fear most about mosquitoes, but what we gain from them while they are feeding. A female uses her seven mouth parts to cut a hole through the skin, penetrate a capillary and suck up blood.

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During feeding, she injects saliva, to which many people are allergic, and may pass on various parasites, including those that inflict malaria, yellow fever, and filariasis (caused by small worms).

Malaria still kills more people than any other disease in the world. It is most problematic in tropical countries but is again becoming important in North America. Malaria did occur naturally in Canada and the United States until the early part of this century. The *Anopheles* mosquitoes that can carry the protozoan parasites still live here but there is presently no reservoir of the disease organisms in the human population. Today most Canadians who get malaria, contract the disease while travelling to other countries.

However there have been rare cases of Canadians and Americans who got malaria without travelling; probably from infected mosquitoes that were accidentally imported with international flights. Health officers worry that malaria may become re-established in North America. Global warming may trigger environmental changes

that allow it to make a comeback.

In Alberta, the only mosquito-borne parasite that we have to contend with is the virus that causes Western Equine Encephalitis. WEE is endemic in that it is always present in local mammals, birds, reptiles and amphibians. The virus seems to cause only minor problems to native species, but people and horses have only been here for several hundred or, at most, a few thousand years and are not adapted to it. In humans, the virus may produce symptoms ranging from a mild headache to fever, coma and, in a few cases, death. Vaccines are available for horses and to some extent for humans. WEE is a common disease (epidemic) only in certain years when the mosquito populations of

certain species, notably *Culex tarsalis* and *Aedes dorsalis*, are high in early summer and there is a large reservoir of virus in the local animals. This occurred in the early 1940s, 1960s (which gave me summer jobs identifying mosquitoes and paid for my undergraduate education), and 1970s.

There is no need to fear that mosquitoes will transmit the AIDS virus. The HIV virus does not multiply within mosquitoes, or other biting flies, and so is not adapted to being spread by them.

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