

Vectors for Dirofilariasis

Recently, a few cases of subcutaneous dirofilariasis on humans were reported in Hong Kong. The eyes of the patients were infected with filarial nematodes of the species *Dirofilaria repens* or *Dirofilaria hongkongensis*.

D. repens is in nature a parasite of dogs that causes zoonotic filariasis. Adult parasites lodge in the subcutaneous tissue of dogs and produce microfilariae which are found in peripheral blood. When a mosquito feeds on an infected dog, it also ingests the microfilariae with the blood meal. Once inside the mosquito, the microfilariae undergo further development and then infect another vertebrate host when the mosquito takes another blood meal. Human is an accidental host of zoonotic filariae and is infected when bitten by an infected mosquito. Infection commonly results in nodules under the skin and under the conjunctiva of the eye. The disease does not transmit from person to person. *D. hongkongensis* was firstly identified in Hong Kong in 2012 but little is known about it.



Human infection can be prevented by maintaining pet dogs on lifelong heartworm preventatives as advised by their veterinarian, as well as by controlling the mosquito vectors. Vectors for *D. repens* include mosquitoes in the genera of *Aedes*, *Anopheles*, *Culex* and *Mansonia*. As all of these four mosquito genera exist in Hong Kong, comprehensive mosquito prevention and control work is needed to avoid the transmission of the disease by the vectors. Source reduction and elimination of breeding places are the first choices of methods to control vector mosquitoes. Stagnant water, which is the breeding ground for *Aedes* and *Culex*, has to be drained and eliminated. Slow flowing streams provide breeding grounds for *Anopheles* and they have to be appropriately modified / maintained to deprive the environment from being suitable for *Anopheles* breeding. *Mansonia* breeds in ponds with aquatic plants such as water hyacinth. If possible, mosquito-eating fish can be kept in the ponds as a biological control. When the breeding places are unable to be eliminated within a short period of time, mosquito larvicides have to be applied to the water to kill their aquatic stages. When there is a heavy infestation of adult mosquitoes, application of adulticide is needed to quickly suppress the problem.



Reference:

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Can soapy water be used against mosquito infestation?

There has been increased interest in using soaps to control insect pests. One of the common practices is to mix soap with water to produce soapy water as an alternative way to chemical controls against breeding of mosquitoes in stagnant water. Can soapy water really be used against mosquito infestation?

Soap is a salt of fatty acids (vegetable or animal oils) and mainly used as surfactants for cleaning. When soap is added into a water body, the surface tension of water is reduced or broken; and adult mosquitoes will be unable to stand on its surface. Any mosquitoes that attempt to stand on the soapy water may sink and fail to lay eggs on the surface. If the concentration of soap is in lavish amount, it can be lethal to the mosquito larvae in the water bodies as well. Although the soapy water theoretically can prevent mosquitoes from breeding in stagnant water, there are factors that can greatly affect its effectiveness in practice.

The soapy water can only be effective when the mosquitoes come in contact with it. Mosquito species, such as vector of dengue fever - *Aedes albopictus*, have ability to lay eggs above water level or inside dry containers; soapy water may have little or no effect to the control of those species.

An effective combination of soap and water is crucial to break the surface tension of stagnant water for preventing mosquitoes from breeding. However, there are no established standards for the effective combination of soap and water in mosquito control, as the combination varies greatly with application situations and types of soap used.

Water with high mineral content (i.e. hard water) can cause precipitation of fatty acids in soap and greatly reduce the effectiveness of soapy water. In addition, there are animals and plants that may be sensitive to the soapy water, application without proper understanding can cause adverse effects to our natural environments.

At the moment, World Health Organization does not suggest the use of soap or soapy

water for combating mosquito problems. Besides, there are little scientific researches to support the use of soap against mosquitoes in field. In other words, soap is not recommended to be used against mosquito infestation in any ways.

To effectively control mosquitoes, elimination of breeding places is of prime importance. If immediate removal of breeding places is not allowed, biological or chemical control measures can be applied to avoid breeding of mosquitoes. Moreover, always adopt suitable personal protective measures while performing outdoor activities or in mosquito-infested areas.

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