

## Fumigation

Fumigation is a method of introducing a toxic chemical into an enclosed space so that it quickly disperses in its gaseous state to reach target pests and kill them. Fumigants in the air enter insect pests through their spiracles or the lungs of vertebrate pests, e.g. rodents, as they breathe. Aerosols, fogs, smokes and mists are however not fumigants because they are not gases. Instead, they are only suspensions of particulate matter in air.

Fumigation provides rapid pest management by dispersing the toxic chemical from the source of introduction to all air spaces within an enclosed area. Fumigants penetrate pores in wood, cracks, crevices and the commodity being treated. Hence they are used in many situations for controlling pests in commodity storage, milling machinery, structural wood and a variety of quarantine products.

For the success of fumigation, the fumigation process should include the following:

1. Planning and preparation
2. Structure sealing, securing and posting
3. Fumigant introduction
4. Monitoring and adjusting for safety and success
5. Aeration
6. Clearance
7. Clean-up and follow-up

Each fumigant has advantages and disadvantages. A fumigator must have a thorough understanding of the properties and characteristics of fumigants. The following points should be considered for selecting the most appropriate fumigant in performing pest control operations:

1. Killing effects on pests – some fumigants kill rapidly but others kill more slowly
2. Warning properties – some fumigants might be colourless and / or odourless
3. Boiling point – some fumigants might be easy to convert from their liquid to gaseous state
4. Diffusion and Penetration – some fumigants might be easy to move from an area of high concentration towards an area of low concentration
5. Binding and Penetration effect on material surface – some fumigants might be removed easily from the air by the material surface and not available for respiratory uptake by pests
6. Residues – some fumigants might leave an excess amount of toxic residues which have potential risk to human health
7. Detrimental effects on commodities – some fumigants might result in foul or unpleasant odours in furnishings, commodities or other materials in the treated place

Depending on the dosage, fumigants can be very toxic. When handling fumigants, safety precautions should be taken to prevent injury. Precautions should be taken against respiratory inhalation of the toxic chemicals and skin contact of the fumigants in their liquid form. Hence fumigant labels should be carefully followed for proper selection and required use of protective equipment. In addition, fire hazards should be considered as some fumigants are explosive and / or flammable. Appointment of a qualified pest control company is recommended for provision of professional and safe services on fumigation.

**(Special permit is needed for carrying out fumigation in Hong Kong)**

M. Y. LEUNG, Pest Control Officer

## **Aedes albopictus as an important dengue fever vector**

*Aedes albopictus*, also known as the Asian Tiger mosquito, is considered to be one of the main vectors of dengue fever and plays an important role in the transmission of a number of human *arboviruses*, including *chikungunya* fever as well. *Aedes albopictus* was first collected in Calcutta of India many years ago and was subsequently found in tree holes in the forests of south-east Asia. *Aedes albopictus* can establish its foot-hold in temperate areas permanently, by *overwintering* in the egg stage through a *diapausing* embryo mechanism. The eggs of *Aedes albopictus* are laid in natural water containers such as tree holes and bamboo stumps as well as artificial containers in wintertime and remain there for *overwintering*. When environmental conditions become *favourable* in spring, the eggs would be induced to hatch by a short photoperiod.

Although tropical forests are reckoned to be its original living habitat, the species has developed the capacity to adapt to and survive in other environments. In Hong Kong, the species can be easily found and is the local



dengue fever vector. The characters and *behaviour* of *Aedes albopictus* make it an important vector in transmitting dengue fever.

*Aedes albopictus* is a small-container breeder and the breeding places (water bodies), both natural and artificial, can be found easily. These breeding places are also available in the areas with human activities such as residence, school and office as people would create artificial breeding places. More breeding places in areas with human activities are expected and *Aedes albopictus* hatching out from these water bodies encounter human readily and bite people instantly.

In fact, a human is one of the choices of *Aedes albopictus* in getting blood meals, while some other species of mosquitoes do not prefer feeding on a human. Even though an *Aedes albopictus* has found a human to feed on, it normally does not get its full blood meal from a single person. It bites a number of people for getting its full blood meal instead. More people would be affected by a single infected *Aedes albopictus*.

In addition, *transovarial* transmission occurs in *Aedes albopictus* as it passes dengue virus from a parent mosquito to its offspring. It enhances the establishment of dengue virus in an infected area and also makes the virus more difficult to be fully eradicated.

Since infected *Aedes albopictus* is difficult to eliminate, stringent mosquito prevention work should be implemented.



*Larvae of Aedes albopictus*