Control of Mosquitoes in Bangkok

There are many methods of mosquito control, the actual choice of methods will, of course, depend upon many factors. At the present time, the mosquitoes become a serious problem of Bangkok. All of methods of mosquito control should be studied, and choose the suitable methods to control the mosquitoes in Bangkok. Before mention of mosquito control, it is necessary to know about breeding places of mosquitoes in Bangkok.

Breeding Places of mosquitoes in Bangkok

(1) Canals and ditches

Bangkok is intersected by a very extensive canal system. This system is now the main outlet for both surface water and sewage. Some canals also extend for long distances inland and are used for irrigation purposes. There are also a large number of canals and ditches which have been constructed alongside the wider main roads, to drain, and also to provide filling material to enable the roads to be lifted above the general ground level.

At the present time, for the widening and improving of roads in the Municipality with closed surface water drainage culverts, many canals will be filled for that purpose. However, many of the canals shall be retained in use for transportation, for drainage and irrigation purposes and to maintain the character of Bangkok.

The following is a list of the canals which the government has decided to retain :-

1. Klong Lhord
2. Klong Bang Lamphu (and Klong Ong Ang)
3. Klong Phadung Krung Kasem
4. Klong Chong Nonsi
5. Klong Phai Singto
6. Klong Ban Klocy
7. Klong Mahanak
8. Klong Sam Sen from River-Klong Tun
9. Klong Bang Su from River-Klong Lat Phrao
10. Klong Huai Kwang, Klong Phraya Woek
11. Klong Lat Phrao
12. The Klong at the eastern end of Rama 4 Road.

13. Various irrigation canals, i.e. Klong Prem Prachakon, Klong Saen Saep, Klong Tun, Klong Phra Kanong.

It is a fact that mosquitoes do not breed in swiftly running water, but there will be found obstructions, vegetations, or pools which will sufficient check the current of the canal to allow breeding. Sometimes, mosquitoes have been found to breed on banks of silt and refuse which are formed by the discharged of debris and sewage into the canals.

(2) Ponds

Many of houses have ponds in the gardens formed in what were originally borrow pits. Water in these ponds may be used for growing of plants or for fishing. There will be found vegetations, obstructions. In some houses, waste water will be discharged into ponds. These ponds may be the breeding places of mosquitoes.

(3) Street culverts

The existing surface water drainage system which have been developed in Bangkok over a long period of years is laid [illegible] to extremely flat gradient, many culverts being dead level. Sometimes, as the water level in the canals at high tide back up these culverts, the sewage cannot discharge to the system of canals or river. The sewage may stand for a long period of time, and the mosquitoes may breed in these culverts.

(4) Low areas

It is obvious that the natural ground level of Bangkok is higher than Mean Sea Level just a little. By this reason, there are many places which are flooded due to the tide rising. In the wet period of the year, some areas are frequently flooded to a depth of several centimetres, because it cannot find its way to drain. Ideal bredding conditions are to be found.

(5) Containers

Water containers which may produce mosquitoes around houses are of course numerous. Such containers are water

tanks, jars,septic tanks, unused containers and the other artificial containers, which allow the mosquitoes to lay its eggs.

(6) Miscellaneous

Miscellaneous breeding places which may be mentioned are as follows : leaky water cutoffs, other leaks in pipes, sagging roof gutters which hold water after rains, tree holes, and the others.

Scheme of Control Works

Mosquito control in Bangkok has been done mostly by the government. The result is not yet satisfied, which will be studied in the part of "Existing Control of Mosquitoes in Bangkok".

Mosquito control in Bangkok, the works should be divided into two ways.

1. Governmental Control
2. Public Control

1. Governmental Control

The steps of control works are as follows :-

(1) Surveying : surveying must be included of :-

- contour survey
- nature of ground
- number of houses, kinds, waste water to be discharged
- population
- breeding places
- number of mosquitoes
- species of mosquitoes

(2) Division of Area

We know that Bangkok has widely area, so it would be divided into districts or sections, and the controllers assigned to each one.

(3) Choice of Methods.

There are many general methods of mosquito control, the considerations in choice of methods will depend upon many factors. The suitable methods which may be used to control the mosquitoes in Bangkok, are described later.

(4) Check of result

The controllers would make check the result of controlling works which have been done. It can be easily check by determination the amount of adult mosquitoes and larvae, and compare with the amount before the control has been done.

(5) Educational Method

The government ought to give the education about mosquitoes, mosquito control, to the people. The success of mosquito control in Bangkok will be greatly facilitated by the cooperation of the householders.

Methods of Control to be used

1. Improvement of Canals and Ditches

The canals may be materially improved by clearing of vegetation and other obstructions. Deepening and embankment of some canals must be done if possible, it will also eliminate the breeding places of mosquitoes. Many of canals which shall be retained in use for some purposes must be improved by this method. In the case of ditches, ditches should be carefully maintained or they

may themselves become breeders of mosquitoes. Brush and vegetation must be removed. Eroded banks may be protected by retaining wall.

2. Street Drainage

Mosquito control in Bangkok will be greatly facilitated by proper attention to street drainage. At the present time both sewage and surface water are discharged through the same system of pipes or culverts to the canals and Chao Phraya River. The sewage may stand in culverts for a long time due to the tide rising, or may be flooded due to heavy rainfall. So, it is obvious that street culverts or pipes may be breeding places of mosquitoes, especially the Culex quinquefasciatus. It has a predilection for sewage as a breeding place. About 95% of mosquitoes in Bangkok are Culex quinquefasciatus, so the improvement of drainage system will decrease a large number of mosquitoes.

The government has decided to improve the existing drainage system. A new drainage system is required to enable sewage to be diverted from the canals and discharged to a treatment works at Chong Nonsi, and that improvement must be made to the surface water drainage to overcome

flooding. Drainage is costly, but it also served the purpose of mosquito control.

3. Filling

Low areas which may be flooded can be adequately kept from breeding mosquitoes by filling. Flooding is a nuisance to property owners. This trouble could most effectively be eliminated by raising the level of the ground surrounding the property up to that surface water would be discharged into the road drainage system. If that road has no culvert to drain, the surface water will flood the other lower areas. The municipality ought to limit the level for filling to prevent of flooding.

Unused ditches, ponds and the low areas should be filled to eliminate the mosquito breeders.

4. Clearing of Land

Bangkok has heavy rainfall, the lands are covered with grasses, vegetation and plants, these will hide the wind and sunlight shining to the ground surface. It is the shelter of mosquitoes to breed in small pools which formed due to rainfall or the tide rising. Clearing of

land may be accomplished by cutting or hoeing of vegetation and brush. Care should be taken that the conditions of land which can produce breeder, should be eliminated, if possible.

5. Use of Toxic Substances

This method is not the method of elimination the breeding place, but it is a killing method. Areas that cannot be drained, such as ditches, ponds, may be breeding places of mosquitoes. The larvae and pupae of the common varieties of mosquitoes may be killed by the use of toxic substances. The application of toxic substances are described in "Gerneral Methods of Mosquito Control". There are many of such substances, but some substances must be used with caution where aquatic life is of importance.

Adult mosquitoes may be eliminated by this method, such as fumigation, spraying. The use of toxic substances are costly, and it is a temporary method. Breeding places which have been controlled by this method, of course, after a period of time, it will breed mosquitoes again.

6. Miscellaneous

Possible places which may produce mosquitoes are of course numerous. The consideration in choice of methods depend upon the breeding places in each case. The following are example of methods to be used in mosquito control.

- Natural enemies.

There are many kinds of natural enemies. However, of the natural enemies, only fish appear to be useful from a practical standpoint. This method is a cheapest method, but fish have their limitations under natural conditions. Some local fish is the feeder upon larvae and pupae and multiplies rapidly. It is particularly valuable as a fish to be used in stocking mosquito - breeding waters : ditches, ponds and others.

- Repair of leaks of defects in water supply plumbing.

The leak of water may result in pool of water, so pipe should be repaired immediately. The pool of water can be eliminated by filling before it become mosquito breeder.

- Removal of unnecessary artificial containers.

There will be found a large number of unused containers, which the water may remain in that containers. These should by removed or destroyed, or they may themselves become breeders of mosquitoes.

2. Public Control

It is obvious that the success of mosquito control depends upon the cooperation of the people. The conditions of ground surrounding the property which may be breeding place of mosquitoes should be eliminated by the householders. They should know that it is their duty to control the mosquitoes in their areas.

Methods of Control

(1) Screening and mosquito proofing

Living in a screened house is one of the best ways of avoiding nuisance and transmission of disease. Screening is also prevention of other insects.

Water containers, such as water tanks, jars, septic tanks or other containers should be in the conditions of mosquito proofing.

(2) Elimination of Breeding Places

There will be found a large number of breeding places which may produce mosquitoes around residences and places of business. Ditches, borrow pits, low areas should be filled if possible, if it is not possible to fill, it may be maintained in a good condition. Brush, vegetation may be eliminated the condition of breeding by cutting or hoeing.

Leaky water cut offs, other leaks in pipes or waste water drainage system must be repaired immediately. The unused water containers should be removed or destroyed.

(3) Use of Toxic Substances

Water in ponds, ditches may be used the method of oiling, if the aquatic life are not of importance. This will serve the purpose of killing the mosquito larvae and pupae. Spraying may be used to kill the winged - mosquitoes outside and inside area of houses.

Existing Control of Mosquitoes in Bangkok

The existing control works of mosquitoes in Bangkok is controlled by the municipal officers. Considerable progress has been made in recent years to reduce the incidence of disease which is carried by mosquitoes, and

to reduce the nuisance problem. The methods which have been done are fumigation, oiling, filling, improvement of drainage system, and the other methods. Somes are indirect methods, and somes are direct methods to control the mosquitoes.

The disadvantages of the existing control of mosquitoes in Bangkok are shown in the following.

(1) The existing control works which have been done, mostly are in the limited areas. Those areas are the pilot-controlled area, for example, the boundaries of the areas near Sawanee, Wad Sam Phraya and the other areas.

(2) The officers as controllers, are not enough to work in all area of Bangkok.

(3) The control works have been done without the cooperation of the people.

These disadvantages result the control works unable to serve the purpose of mosquito control as possible.