

**For discussion on
20 January 2020**

ACFEH Paper 2/2020

**Advisory Council on Food and Environmental Hygiene
Mosquito Control Work**

Purpose

This paper briefs members on the Government's plan on enhancing mosquito control work, including application of technologies and this year's plan.

Enhanced mosquito control work

2. The All-out Anti-mosquito Operations carried out in 2019 is considered effective in keeping mosquito proliferation under control and in enhancing coordination of mosquito control work among departments. The Pest Control Steering Committee (PCSC) set objectives in three areas earlier in 2019, namely, strengthening prevention, coordination and surveillance. In terms of prevention, the Government has adopted earlier preventive measures, including regular fogging operation and mosquito prevention work.

3. Through enhanced interdepartmental coordination, the monthly ovitrap index for *Aedes albopictus* has dropped significantly since June 2019. The 2019 monthly ovitrap index is at **Annex**. It is the first time since 2015 that no area exceeded the alert level in the rainy season since August.

4. In 2019, a total of four areas with the Area Ovitrap Index (AOI)¹ exceeding the alert level for two months or above were recorded, fewer than the six areas recorded in 2018. The number of times that the AOI has exceeded 40 per cent has decreased from three in 2018 to one in 2019, while that between 20 and 40 per cent has also dropped from 32 in 2018 to 25 in 2019.

¹ AOI indicates the extensiveness of the distribution of Aedine mosquitoes in that particular area surveyed. The Ovitrap Index for *Aedes albopictus* can be classified into 4 levels, with 20% as the alert level.

5. Having said the above, dengue fever has become endemic in many countries in Southeast Asia and several Asian countries experienced unusually high number of dengue fever cases in 2019. For example, 414 532 cases were recorded in the Philippines, 241 863 cases were recorded in Vietnam and 136 422 cases were recorded in India over the past year. There was a total of 196 imported cases recorded in 2019. There was also a confirmed local case recorded on 4 November 2019. As such, the Government would remain vigilant in sustaining the mosquito control work.

Application of technology

Gravitraps

6. The Food and Environmental Hygiene Department (FEHD) has been conducting field trial on a re-designed ovitrap with a sticky trap mounted inside the trap for collecting adult mosquitoes directly. The new design, known as gravitraps, was tested in Wong Tai Sin, Cheung Chau and Yau Tong from June to November 2019. Different sticky traps were tested for their attractiveness and stickiness. Although the number of adult mosquitoes collected was generally low, 30 adult mosquitoes were collected in one of the gravitraps, indicating that gravitraps are able to attract and collect adult mosquitoes to show their density.

7. FEHD has finalized the design of the gravitraps with reference to previous trial results and will extend its application to all districts. A total of around 5000 gravitraps will be installed over the territory in March 2020. In addition to the AOI which indicates the extensiveness of distribution of mosquitoes, adult density index could be enumerated which refers to the average number of adult mosquitoes collected in each positive ovitrap to reflect the density of mosquitoes. The additional information collated will help relevant parties to adjust their anti-mosquito work for a more targeted approach.

New mosquito traps (In2Care)

8. Following FEHD's studies on the application of the In2Care mosquito trap, results show that the trap is able to attract female *Aedes albopictus* and allow auto-dissemination of the insect growth regulator (IGR) to other breeding grounds when they land in other water bodies. The IGR disseminated to other breeding sites can prevent mosquito larvae from maturing. FEHD provided 130 traps for departments' trial (including Leisure and Cultural Services Department (LCSD), Housing Department (HD), Department of Health and Hospital Authority (HA)) in Ma On Shan and Sheung Shui and feedback from departments have been very positive. For example, HD reflected that mosquito larvae were observed inside the traps in most of the trial estates.

9. A total of over 2760 In2Care traps will be deployed by the Agriculture, Fisheries and Conservation Department, Electrical and Mechanical Services Department (EMSD), HA, HD, LCSD and FEHD before March 2020. The traps would be placed in departments' venues with dense vegetation, where potential mosquito breeding places may be found and fogging operations or other mosquito control measures are hard to reach before the rainy season, to keep the population of adult mosquitoes under control.

Other technologies under exploration

10. FEHD together with EMSD are also exploring the use of drone or robot for enhancing effectiveness of application of insecticides at hard to access areas, e.g. slope with dense vegetation. If proven technically feasible, the new method may apply to fogging operations to increase their coverage.

11. FEHD is also looking into the feasibility of containing the local mosquito population by releasing certain strain of an endosymbiotic bacteria, *Wolbachia* given mosquitoes' ability to reproduce and transmit dengue fever are adversely affected if mosquitoes infected with different strains of *Wolbachia* reproduce. As there are different strains of *Wolbachia*, FEHD had commissioned the Chinese University of Hong Kong (CUHK) to conduct a study on the local natural infection rate of *Wolbachia* in Hong Kong's *Aedes albopictus*

population with a view to understanding the composition and dynamics of Wolbachia occurrence. FEHD would consider experience from other countries and liaise with CUHK on further studies to assess feasibility of Wolbachia for local deployment.

All-out Anti-mosquito Operations

12. In light of the effectiveness of the All-out Anti-mosquito Operations carried out in 2019, the Operations will be implemented again in 2020 following the previous protocol. During the dry season, departments will carry out mosquito prevention measures, with an aim to reduce potential mosquito breeding sites as far as possible. Departments will also pay special attention to permanent or semi-permanent structures that can hold water, e.g. key holes of manhole covers, surface channels, sand traps, drains of canopy of covered walkways, scaffolding, etc. In addition to regular prevention measures, In2Care traps will be installed before the rainy season for areas with natural breeding sites, e.g. fallen leaves, tree holes, bamboo stumps, etc.

13. Having reviewed the 2019 Operations, PCSC has reminded departments to pay special attention to the following areas:

- Importance of mosquito prevention work - fogging operations are used to suppress adult mosquitoes' density and can only provide short term effect. The density of adult mosquitoes can surge shortly after fogging if comprehensive larval control measures are not implemented at the locations. Departments are reminded to maintain their larval control actions by elimination of breeding places and application of appropriate larvicides properly throughout the Operations.
- Constant update of blackspot lists - departments should add locations found with positive ovitraps to their list of black spots for carrying out fogging operations. The black spot lists should be constantly updated to reflect changes in black spots and allow timely follow-up actions to be taken.

14. Prior to the rainy season, departments will be notified to start the Operations simultaneously in around March or April 2020, which includes regular fogging operations, to suppress the density of adult mosquitoes and eliminate the potential mosquito breeding places. All concerned departments will conduct the anti-mosquito work within their venue until the end of the rainy season.

Quantitative Approach

15. Following the collection of adult mosquitoes by gravitraps, FEHD plans to release a new adult density index in March 2020 which can reflect the density of adult mosquitoes. This new data may be more accurate in representing the distribution of mosquitoes than the original ovitrap design, which can only provide qualitative data.

Conclusion

16. The Government will continue to enhance interdepartmental coordination on mosquito control work. Meanwhile, FEHD is actively exploring the application of suitable technologies and will provide technical support to various departments for extending the application of effective technologies across the territory. With reference to last year's experience in carrying out the All-out Anti-mosquito Operations, the Operations this year will adopt a similar approach.

17. Members are invited to note the content of this paper and provide comments.

Food and Health Bureau

Food and Environmental Hygiene Department

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2009-18年與2018及2019年每月白紋伊蚊誘蚊產卵器指數比較
 Comparison of Monthly Ovitrap Index for *Aedes albopictus* (2009-18, 2018 and 2019)

