For discussion on
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Legislative Council Panel on Food Safety and Environmental Hygiene Subcommittee on Issues Relating to the Improvement of Environmental Hygiene and Cityscape

Enhancement of Control Work of Mosquito and Biting Midge Infestation

Purpose

This paper briefs Members on the enhancement of control work of mosquito and biting midge infestation undertaken by relevant Government departments.

Mosquito Prevention and Control Work

Strategy and effectiveness

2. Based on past experience, early prevention is the most effective approach for controlling mosquito infestation. In this connection, relevant Government departments will eliminate potential mosquito breeding places in a targeted manner before the rainy season, and conduct fogging operations to eliminate mosquitoes together with larval control and environmental management once the rainy season arrives, with a view to avoiding extensive mosquito breeding during the rainy season.

3. With the concerted efforts of various Government departments (including the Education Bureau, Housing Department (HD) and Leisure and Cultural Services Department (LCSD)) in carrying out the All-out Anti-mosquito Operations[1], a total of 69 771 mosquito breeding places were

[1] Measures of the All-out Anti-mosquito Operations include: carrying out fogging in the scrubby areas within a 100-metre radius around residences weekly to kill adult mosquitoes; carrying out inspection, removing stagnant water, applying insecticide and disposing of abandoned water

eliminated in 2020. Mosquito prevention and control work last year had continued to achieve progress. There were only 5 survey areas with Area Gravidtrap Index (AGI) exceeding 20% for two months or more, and no survey area had AGI exceeding 40%. In each of the past two years, there was only one confirmed local dengue fever case respectively[2], and no cases have been recorded thus far this year. The number of mosquito related complaints received by the Food and Environmental Hygiene Department (FEHD) from 2017 to 2020 is tabulated as follows:

Year	No. of mosquito related complaints
2017	7 471
2018	9 750
2019	6 812
2020	5 425

Inter-departmental collaboration

4. In light of the effectiveness of the All-out Anti-mosquito Operations (the Operations) carried out in the last two years, departments have commenced the Operations since 12 April 2021 following the established protocol, including regular inspection to eliminate potential mosquito breeding places, as well as fogging operations to suppress the density of adult mosquitoes at areas in close proximity to human dwellings. All concerned departments are conducting anti-mosquito work in venues under their management (including locations in close proximity to human residences, parks, schools, construction sites, public housing estates, hospitals, waterfront public and private cargo working areas, cross boundary check points, typhoon shelters and cross boundary ferry terminals) until the end of the rainy season.

containers weekly to prevent mosquito breeding; and trimming of grass to discourage resting of the adult mosquitoes on the site.

[2] Dengue fever has become endemic in Southeast Asia. In 2020, Vietnam, Malaysia and the Philippines recorded 121 398, 88 074 and 83 155 cases of dengue fever respectively, while the number of imported dengue fever cases in Hong Kong last year was 21.

5. The Operations aim to suppress mosquito density by mean of an integrated approach composing of a series of different mosquito control measures. Emphasis is put on the elimination of potential breeding sources in advance before the rainy season. Departments would carry out thorough inspections of the venues under their purview and make comprehensive records of all potential breeding places identified within the venues for the following weekly inspections and remedial control measures, such as larviciding. Departments would pay special attention to permanent or semi-permanent structures that could hold water, e.g. key-holes of manhole covers, surface channels, etc. Modification to these structures, such as plugging or covering the keyholes of manhole covers, would be done during cool and dry seasons. These measures could greatly reduce the breeding grounds for mosquitoes.

Application of technology in anti-mosquito work

6. In addition to regular prevention measures, a total of over 5 500 new mosquito trapping devices[3] have been deployed by FEHD and other departments by the end of March 2021. The traps are placed in departments' venues with dense vegetation, e.g. fallen leaves, tree holes, bamboo stumps, etc., where potential mosquito breeding places may be found yet fogging operations or other mosquito control measures can hardly cover, to keep the population of adult mosquitoes under control.

Quantitative surveillance of mosquito infestation

7. FEHD has been strengthening the surveillance of mosquito infestation to facilitate the targeted deployment of mosquito prevention and control work. Since April 2020, FEHD has put in place newly designed gravidtraps as a replacement for the ovitraps previously used. The gravidtraps can directly count the number of adult mosquitoes to enumerate the new Gravidtrap Index (GI) and Density Index (DI). The GI is similar to its predecessor (Ovitrap Index) which reflects the extensiveness of distribution of *Aedes albopictus* in the survey area, but is available earlier for timely surveillance due to simplified procedures leading to shorter

[3] The device is able to attract female Aedes albopictus and allows 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.

reporting cycle. As for the new DI, it indicates the average number of adult *Aedes albopictus* collected in each *Aedes*-positive gravidtrap to better quantify their activity level. To enhance dengue vector surveillance, FEHD has also increased the number of survey areas from 62 (about 3 360 gravidtraps) to 64 (about 3 440 gravidtraps) since January 2021.

8. With the use of gravidtraps, a new DI is devised to indicate the density of *Aedes* mosquitoes in individual gravidtraps as well as in the whole survey area. From the data collected between April and December 2020, the highest Area Density Index (ADI) recorded was 4.5 but the majority of ADIs fell within the range of 1.0 to 2.0, while the territory-wide Monthly Density Index varied within a much narrower range of 1.0 to 1.5. As gravidtraps have only been used for less than a year, the diversity of data is still limited and the data collated throughout different seasons in a year are not yet available. FEHD will summarise and review all data by the end of 2021 with an aim to establish a reference level for corresponding prevention and control measures for the DI.

Enhanced measures

9. We will adopt the following measures to further enhance our mosquito prevention and control work –

(a) **Prompt follow-up upon triggering of the alert level** – departments will promptly carry out targeted mosquito prevention and control work upon notification of the GI exceeding the alert level of 20%, with a view to suppressing the overall AGI for the same month and thereafter. FEHD has started to provide hotspot analysis on locations persistently recorded with positive findings in gravidtraps as well as locations with high number of adult mosquitoes collected in individual gravidtraps for targeted control actions by relevant departments;

(b) **Constant update of the list of hotspots** – departments will pay special attention to locations of gravidtraps with repeated positive findings or exceptionally high number of mosquitoes, and add them to their list of hotspots for carrying out fogging operations. The list

of hotspots will be constantly updated to reflect changes in hotspots and facilitate timely follow-up actions; and

(c) **Stepping up enforcement** – in addition to the routine anti-mosquito programme, FEHD has stepped up inspection frequencies and taken out prosecutions under the relevant legislation against mosquito breeding. FEHD has set up four Pest Control Inspection Teams since May 2017 to step up inspections of construction sites and enforcement actions against mosquito breeding places.

Prevention and Control Work of Biting Midge Infestation

10. Biting midges are minute blood sucking flies that breed in aquatic or semi-aquatic environment and aquatic, being found in damp places or in mud. Due to the short flight range of biting midges, they are generally found concentrated near places where there is a suitable breeding environment, e.g. soil surface with lots of fallen leaves and withered plants, sand traps, or choked surface channels. In a territory-wide survey of midges in Hong Kong conducted by FEHD in 2017-2018, no biting midges species that could transmit diseases to humans was found. In addition, the World Health Organization does not set guidelines for systematic monitoring of midges.

11. As these breeding places of midges are somewhat similar to those for *Aedes albopictus*, control actions taken for elimination of potential mosquito breeding places, e.g. removal of fallen leaves from soil surface or choked surface channels, before the rainy season would also be effective towards biting midges. FEHD has already issued a technical guideline on prevention and control of biting midges to HD and LCSD for early preparation on prevention work to eliminate breeding places of midges, which includes the followings:

(a) Keeping the moisture content of soil surface low by techniques like plough or draining;

(b) Removing refuse, fallen leaves and other decaying vegetation on slopes or on the flower beds as well as choking matters (e.g. muddy soil) in sand-traps/surface drainage channels;

(c) Trimming, on a regular basis, densely grown vegetation to increase the exposure of soil surface to sunlight and air;

(d) Applying residual insecticide of granules formulation at breeding places if environmental control means are not successful;

(e) When trapping devices are used, the devices must be able to operate in round the clock basis and the mesh size of the collection bag should be of 60 x 60 mesh per square inch; and

(f) To allow environmental control measures to take effect, actions should be taken well before the biting midges become active in May.

12. With the concerted efforts in controlling biting midges infestation, a significant downward trend of nuisance caused by biting midges could be observed by the decreasing number of biting midges related complaints received by FEHD from 2017 to 2020 as follows:

Year	No. of biting midges related complaints
2017	120
2018	104
2019	115
2020	56

Provision of Technical Advice and Training to Other Departments

13. To enable the staff of various departments to have a better understanding of pest control work, FEHD has organised pest control training courses / talks for the staff from different Government departments,

such as HD and LCSD. In the past two years, a total of 16 training courses / seminars were organised by FEHD for various Government departments, the property management industry, the pest control services industry etc. to increase their knowledge about pest control, and to help them better manage the venues within their purview and pest control work undertaken by their contractors.

Conclusion

14. Members are invited to note the concerted efforts of various departments on mosquito and biting midges control, and provide comments on the above measures.

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