For discussion on
13 November 2018

LegCo Panel on Food Safety and Environmental Hygiene
Mosquito and rodent control work

Purpose

This paper briefs Members on the measures taken by the Government on mosquito and rodent control in 2018 as well as the key areas of work in 2019.

Inter-departmental Co-ordination

2. The Government has all along attached great importance to pest control work. We have strengthened inter-departmental co-ordination to synergise the efforts of various bureaux and departments in this regard. The Anti-mosquito Steering Committee was re-organised and upgraded as the Pest Control Steering Committee (PCSC) in July 2018. In addition to mosquito control, the PCSC's terms of reference also cover other pest control issues, including the prevention and control of rodent infestation, with a view to enhancing inter-departmental co-ordination.

3. In view of the 29 local dengue fever cases in this summer, the PCSC held two ad hocmeetings in August 2018. Apart from attending the first meeting, the Chief Secretary for Administration convened an inter-departmental meeting in September 2018. The bureaux and departments have offered active support and strengthened collaboration in order to curb the spread of dengue fever in Hong Kong.

4. The PCSC plans to hold a meeting early next year to discuss the 2019 anti-mosquito and anti-rodent plans of various departments. It will also explore ways to enhance the Government's overall surveillance mechanism and response strategies, and to step up co-ordination among the departments.

Technical Support

5. The Food and Environmental Hygiene Department (FEHD) maintains close liaison with other government departments and provides them with technical assistance in implementation of effective pest control measures in areas under their purview.

6. To promote the co-ordination of pest control work of various government departments, the Food and Health Bureau has issued letters to the heads of the departments raising issues requiring their attention in handling the cleansing contracts for different types of facilities. FEHD has also provided contract templates on pest control for follow-up actions by contract management units in various departments so that these clauses can be included in the new contracts.

7. With regard to professional training, FEHD offers assistance to the frontline staff of various government departments by providing them with technical support and training from time to time so as to enhance the effectiveness of the pest control measures. In August 2018, FEHD arranged a number of workshops on pest control for management staff of relevant departments (e.g. the Housing Department (HD) and the Leisure and Cultural Services Department) for more effective supervision of the performance and effectiveness of pest control work provided by outsourced service contractors in venues under their purview.

Enforcement Work

8. From 1 January to 26 October 2018, FEHD conducted inspections of a total of 1 818 premises (covering 1 212 construction sites and 606 other premises) and instituted 182 prosecutions (comprising 173 cases involving construction sites and 9 cases involving other premises).

Mosquito Surveillance[1]

9. To enhance the surveillance of dengue vector, FEHD increased the number of surveyed areas from 52 to 57 in July 2018. The survey frequency has also increased from one week per month to two weeks per month. To keep the public abreast of the latest situation of mosquito infestation and implement corresponding mosquito prevention and control measures in a timely manner, starting from September 2018, apart from announcing the Area Ovitrap Index and Monthly Ovitrap Index, FEHD also releases two additional phased Ovitrap Indices. It is FEHD's established practice to notify relevant government departments of the above indices so as to promptly carry out targeted mosquito prevention and control work.

Territory-wide Anti-mosquito Campaign

10. FEHD intensified the third phase of the anti-mosquito campaign by launching ten-week territory-wide all-out anti-mosquito operations between mid-August and mid-October 2018, including carrying out fogging in the scrubby areas within 200-metre radius of residences every week to kill adult mosquitoes, removing stagnant water weekly, applying larvicides, disposing of abandoned water containers every week, and trimming of grass to remove the potential mosquito habitats. Relevant departments and the Hospital Authority also conducted all-out anti-mosquito operations in areas under their purview.

11. Following the epidemiology investigation result from the Centre for Health Protection (CHP) for identifying Lion Rock Park as one of the infection sources of the local dengue fever cases, the Leisure and Cultural Services Department closed Lion Rock Park on 17 August 2018 to carry out anti-mosquito operations. Meanwhile, relevant departments stepped up mosquito prevention and control work in areas under their purview in the vicinity of Lion Rock Park. Moreover, the Home Affairs Department, in collaboration with the Civil Aid Service, the Islands District Council and the Cheung Chau Rural Committee, launched two joint operations in Cheung Chau

[1] Since 2003, FEHD has put in place an enhanced dengue vector surveillance programme for monitoring the distribution of *Aedes albopictus* and for evaluating the effectiveness of mosquito prevention and control work carried out by various parties. The surveillance data collected will serve as a basis for adjustment to mosquito control strategies and measures. Ovitraps are placed at selected locations for detecting the larval breeding rate of *Aedine* mosquitoes. The ovitrap index is the percentage of ovitraps that are found to have positive larval breeding result. Two different indices are recorded under the surveillance programme, i.e. the Area Ovitrap Index for *Aedes albopictus* (AOI) and the Monthly Ovitrap Index for *Aedes albopictus* (MOI). AOI indicates the extensiveness of the distribution of *Aedes albopictus* in the surveyed area while MOI reflects the extensiveness of the distribution of *Aedes albopictus* throughout the territory.

to disseminate information on mosquito control and anti-mosquito measures that can be implemented in homes to the residents of the island. CHP and FEHD also held community health talks on dengue fever.

12. As regards health education, FEHD distributed anti-mosquito posters and pamphlets in collaboration with relevant government departments and private property management companies. FEHD and CHP also held community health talks on dengue fever to raise public awareness about mosquito control.

13. The Government's anti-mosquito efforts have achieved positive results. No additional local case has been reported after 4 September 2018. Though the situation is brought under control[2], dengue fever remains endemic in some areas in Asia and beyond. Concerted anti-mosquito efforts are therefore required to prevent local outbreak.

Rodent Surveillance

14. Since 2000, FEHD has made use of the rodent infestation rate (RIR) and its trend to gauge the general situation of rodent infestation in individual districts[3]. Based on the RIRs obtained, FEHD conducts comprehensive rodent survey and assess the seriousness of rodent problem in the vicinity of the areas where rodent infestation is detected. Targeted rodent prevention and control work will be carried out and technical advice will be provided for the parties concerned. In addition to the RIR, FEHD frontline staff have also taken into account the trails left by rodents, complaint figures and the feedback from local community and the public. FEHD will make an overall assessment and implement targeted rodent prevention and control operation in various areas.

Anti-rodent Operations in Designated Target Areas

15. Since May 2017, FEHD has launched a two-month anti-rodent operation in designated target areas in various districts and adopted multi-pronged strategies to step

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[2] CHP announced on 10 October 2018 that the dengue fever outbreak had ended. Subsequently, the Leisure and Cultural Services Department reopened Lion Rock Park on 13 October. Details of the ovitrap indices for *Aedes albopictus* in 2018 are set out at **Annex 1**.

[3] The main purpose of conducting the RIR survey is to monitor the situation of rodent infestation in the surveyed areas and to gauge the extensiveness of rodent infestation in these areas. The survey is conducted every six months. Baits are set in selected localities to gather statistics on the ratio of baits bitten by rodents. Areas which obtain a higher RIR are areas in which more rodent activities were detected during the survey period.

up rodent control work, including improving environmental hygiene, eliminating rodents and taking enforcement actions. During the operation, FEHD has deployed additional manpower and resources to prevent and control rodent infestation by eliminating the three survival conditions of rodents, namely food, harbourage and passages, i.e. the elimination of the food sources and hiding places of rodents, as well as blockage of their dispersal routes. After completing the first phase of the anti-rodent operations in designated target areas in June 2018(See **Annex 2** for details), FEHD immediately carried out work assessment for districts with serious rodent problems, such as Sham Shui Po, Mong Kok and Eastern Districts. On 8 October 2018, FEHD launched the second phase of the anti-rodent operations in designated target areas. Work assessment for various districts will be conducted upon completion of the second phase of the operations for enhanced monitoring of the effectiveness of anti-rodent efforts.

16. Given the public attention towards rodent infestation in public housing estates, besides of the anti-rodent operations carried out by HD, FEHD will conduct joint inspections of the rodent infestation situation with the HD staff and offer professional advice and technical guidance on prevention and control of rodent infestation, including the improvement of rodent-proofing facilities of the buildings. FEHD would also support HD in carrying out anti-rodent work in target public housing estates with serious rodent infestation problems to enhance the effectiveness. On 5 October 2018, FEHD and HD launched a four-week joint cleansing operation in Choi Wan (I) Estate and Choi Wan (II) Estate.

17. FEHD has been adopting a comprehensive multi-pronged approach in its rodent prevention and control work. Targeting districts with relatively high RIRs, FEHD undertakes a variety of rodent control measures, including poisoning and trapping of rodents, destroying rat holes in rear lanes, stepping up street cleansing, encouraging public participation in anti-rodent work, and strengthening publicity and education programmes in rodent prevention and control. The numbers of rodents cleared/caught, rat holes destroyed and warnings issued as at September 2018 are set out at **Annex 3**.

Application of New Technologies

18. Regarding the introduction of innovative technology in pest control work, the Government has been proactively conducting studies and trial tests to assess the application of various pest control methods in Hong Kong. In general, there are four

main kinds of technological products for pest control purposes: (1) pesticides; (2) traps; (3) genetic technology and (4) night vision camera surveillance system. FEHD's findings at the current stage are set out at **Annex 4**.

19. FEHD is actively exploring ways to enhance surveillance and control of mosquitoes and rodents. For dengue vector surveillance, besides releasing phased indices for public's reference, FEHD is conducting studies to improve the design of the ovitraps and to provide more frequent updates of information. Furthermore, FEHD is testing a new mosquito control method which involves the carrying of growth regulators by female mosquitoes to various water bodies to prevent larvae from developing into adult mosquitoes in the water bodies.

20. Regarding rodent prevention and control, apart from conducting trial tests on traps and rodenticides, FEHD will continue to study ways to improve the investigation method of the RIR so that it can reflect more accurately on the situation of rodent infestations in different districts. FEHD is also considering the introduction of night-vision video capturing technology use together with artificial intelligence to obtain a more detailed picture of rodent activities in order to facilitate more effective and targeted application of rodenticides and rodent traps.

Advice Sought

21. Members are invited to note the content of this paper.

Food and Health Bureau
Food and Environmental Hygiene Department
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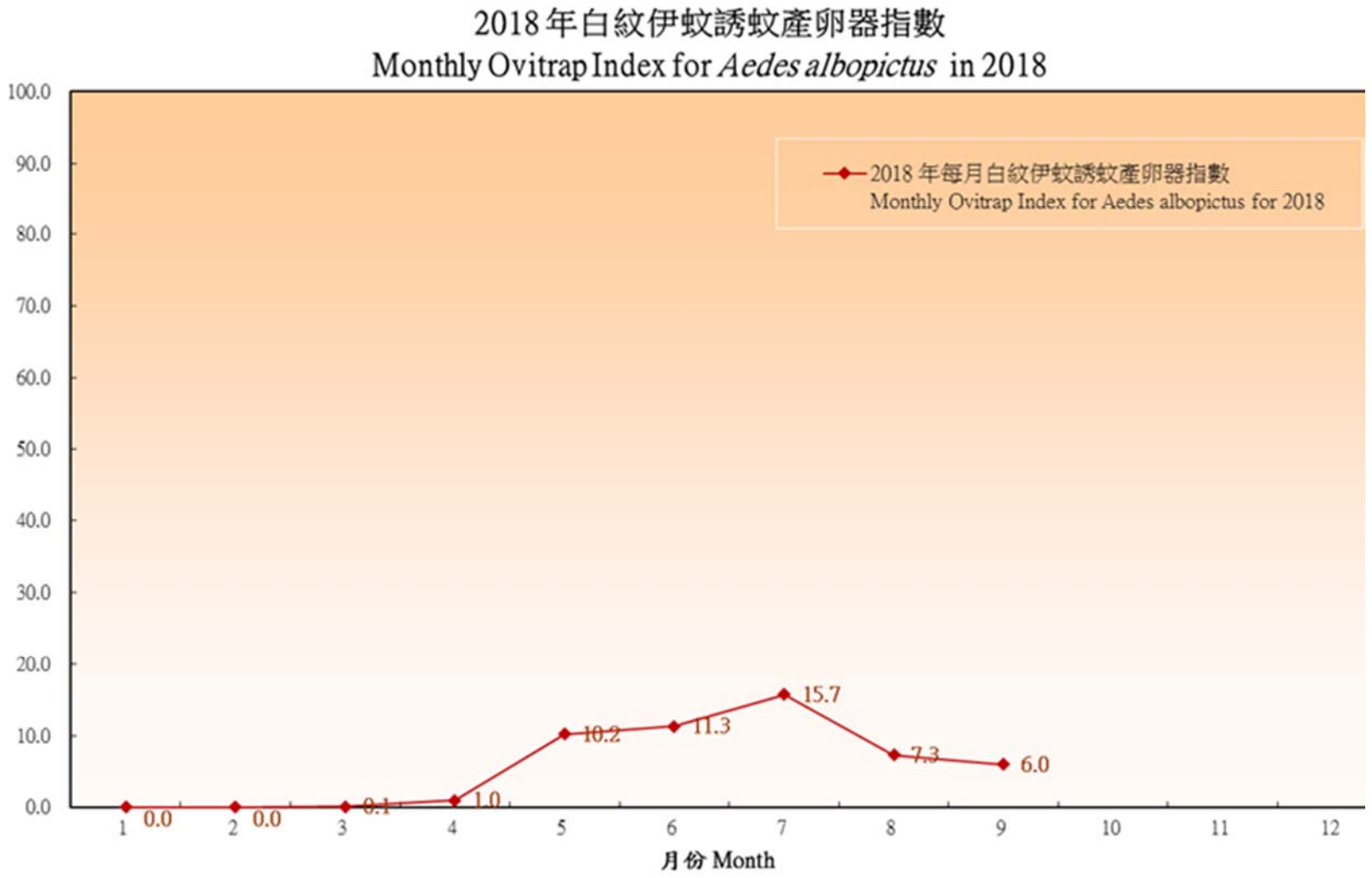
Annex 1


2018年白紋伊蚊誘蚊產卵器指數
Monthly Ovitrap Index for *Aedes albopictus* in 2018
2018年每月白紋伊蚊誘蚊產卵器指數
Monthly Ovitrap Index for Aedes albopictus for 2018
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0.0
0.0
0.1
1.0
10.2
11.3
15.7
7.3
6.0
1
2
3
4
5
6
7
8
9
10
11
12
月份 Month

Annex 2

First Phase of Anti-rodent Operations in Designated Target Areas in 2018 (from 23 April to 22 June)

Action Item	Number
Rat holes destroyed	343
Dead rodents collected	630
Rodents caught	476
Inspections of food premises, markets, hawker bazaars and cooked food markets	13 916
Health advice issued	3 830
Verbal warnings issued	2 069
Warning letters issued	25
Statutory notices issued	52
Fixed Penalty Tickets issued	619
Prosecutions instituted	374

Annex 3

Numbers of rodents cleared/caught, rat holes destroyed and warnings issued from January to September 2018

Number of dead rodents cleared	Number of live rodents caught	Number of rat holes destroyed	Number of warnings issued
20 374	11 787	6 829	3 640

Annex 4

FEHD's Application of New Technologies

Pesticides

At present, the pesticides commonly used for mosquito elimination are synthetic pyrethroids. They are effective in controlling a broad spectrum of pests and can be used to kill different types of arthropod pests. Rodenticides are mainly anti-coagulants. Pesticides used by FEHD have been tested and registered in Hong Kong to ensure their effectiveness. FEHD also keeps in view products that contain new active ingredients. These new products, if applicable, will be treated as alternate pesticides. If pests are found to show resistance to pesticides currently adopted by FEHD, these new pesticides can serve as alternatives[4].

Traps

2. For traps used on rodents, there are electric-driven traps[5] in addition to the traditional mechanical traps. At present, there are electric rodent traps which can kill rodents instantly. The advantage of using such traps is that manual activation and frequent inspections are not necessary. However, since the traps may trap or hurt other small animals accidentally, it is more suitable to place them indoors and in places where there are no other small animals. FEHD will continue to conduct trial tests in suitable environments and make recommendation to relevant departments on the adoption of such traps.

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[4] Some products on the market with sterilant as the main ingredient in can render the pests (e.g. rodents) infertile if applied. However, to have the desired effect, re-application is required to ensure that a substantial proportion of the rodent population has sufficient intake of the sterilant. Moreover, more time is needed to reduce the overall population of rodents.

[5] These electric rodent traps can activate automatically and capture rodents repeatedly. When a rodent gets close to the trap, the trap will activate automatically to capture it. The trapped rodent will be kept in the collection box temporarily. The trap will then open again, and capture other rodents.

Genetic technology

3. Genetic technology is applied mainly in mosquito control. Through the use of biotechnology to modify the genes of adult mosquitoes, adult male mosquitoes will become infertile, or their offspring will die prematurely. In 2016, a British technology firm conducted a test on such technology in Brazil, where Zika virus infections were epidemic. However, the firm only carried out tests of the technology on *Aedes aegypti*. There has been no study on the effectiveness of using such technology on *Aedes albopictus* for the time being[6]. FEHD will continue to keep close tabs on the latest technological development, and evaluate the feasibility of adopting new technologies in Hong Kong by making reference to the recommendations of the World Health Organization. Field test will be conducted when necessary.

Night vision camera surveillance system

4. Generally speaking, rodents are less active in places frequented by human beings and are also less active in day time than at night. By installing night vision camera[7] at locations where rodents are rampant, it is possible to analyse the extent and severity of the rodent problem, e.g. the density of rodents and their movements. Targeted measures can thus be formulated to control and eradicate rodents. Information and data provided by the night vision camera surveillance system can also help to analyse and assess the effectiveness of the existing rodent control measures. However, certain technical and environmental issues have to be resolved before this technology can be widely applied in routine rodent control work. FEHD is considering using the technology in its rodent control work on a trial basis, and will evaluate the feasibility of widely adopting this technology in Hong Kong.

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[6] While studies have shown that infections by different Wolbachia microbes will affect the survivability and disease-transmission ability of mosquitoes, large-scale application of this technology is dependent on the availability of various technologies and the impact on the environment. The World Health Organization has not yet recommended the application of this new technology as a routine measure to curb mosquito infestation.

[7] A night vision camera makes use of optical lens to capture either the dim light reflected by objects, or the infrared light which is invisible to the human eye. When the captured image is magnified thousands to tens of thousands times, it can become visible. The advantage of using a night vision camera in surveillance work is to allow the user to have wide vision of a target in an extremely low-light environment.