資 料

Insecticide resistance in the houseflies of New Yumenoshima, the 15th dumping-island of Tokyo

Kazuo YASUTOMI*

Department of Medical Entomology,
National Institute of Health,
Shinagawa-ku, Tokyo

(Received: November 16, 1972)

Insecticide resistance in the houseflies outbreaken at a dumping site "Yumenoshima" in the Tokyo Bay has been reported by the present author since 1966. The present paper deals with the status of development of resistance in the adult flies inhabiting the 15th dumping-island, 3 km south of Yumenoshima in the Tokyo Bay. This site has been treated with full coverage of organophosphate spray weekly since 1966.

TEST INSECTS AND METHOD

Colonies of housefly: The test insects, *Musca domestica vicina*, were collected four times, in 1967, 1969, 1971 and 1972, from

(F₁) of field collected flies. Larvae were kept under a constant temperature at $27\pm1^{\circ}\text{C}$, being fed on a mixture of "Granular Diet for Experimental Insect" (prepared by Oriental Yeast Manufacturing Co.), wheat bran and dry yeast moistened with water. Five days old adults were brought to test; they were fed with 5% sugar solution and powder milk.

Test method: The level of resistance to insecticides was determined by a topical application method. The chemicals in acetone solution at desired concentration were applied to the surface of the prothorax of female fly by means of a measured-drop technique involving a microsyringe needle. Treated flies were then transferred to the clean dishes for a 24 hour mortality count under a constant temperature of 25°C . From these data the regression of the probit mortality on log of dosage was computed and the LD₅₀ value per fly was obtained as a basis for comparison of resistance ratio.

RESULTS AND DISCUSSION

The results on chlorinated hydrocarbons and organophosphorus compounds are summarized in Table 1. The LD₅₀ values of fly populations collected from the 15th dumping-

Table 1. LD₅₀ values in micrograms per female fly to chlorinated hydrocarbons and organophosphorus compounds

Insecticides	WHO/IN (SRS)	Yumenoshima (1965)	15th dumping-island			
			1967	1969	1971	1972
<i>p</i> , <i>p'</i> -DDT	0.13	100<	100<	100<	100<	100<
γ -BHC	0.07	4.75	8.54	8.49	9.58	9.71
Malathion	0.24	18.51	25.26	53.70	225.0	228.0
Diazinon	0.018	0.83	0.31	0.50	1.39	1.86
Fenitrothion	0.029	0.13	0.16	0.42	1.53	2.64
Fenthion (Baytex)	0.028	0.10	0.14	0.27	0.97	1.75
Dichlorvos (DDVP)	0.013	0.023	0.026	0.077	0.125	0.221

the 15th dumping-island. WHO/IN/*Musca domestica* (SRS) was used as a reference strain for normal susceptibility.

Method of breeding: All tests were carried out with the first laboratory generation

island in 1967 were correlated to those of Yumenoshima colony in 1965. Both *p*, *p'*-DDT- and lindane-resistance has persisted at a high level 10 years after chlorinated hydrocarbons were given up for fly control. In 1971, the remarkably increased malathion-

* 安富和男: 国立予防衛生研究所衛生昆虫部

resistance was found, with the LD₅₀ value of 225 microgram (about 950 times the normal), when other organophosphorus compounds, such as fenitrothion, fenthion and dichlorvos, replaced malathion for 6 years. This quite high level is believed to be due to the intense use of fenthion and dichlorvos. Flies in June, 1972 showed LD₅₀ values of 103 times the normal to diazinon, 91 times the normal to fenitrothion, 62.5 times the normal to fenthion and 17 times the normal to dichlorvos. This colony is considerably more resistant to OP compounds than the Danish resistant strains.

Apart from these results, no difference in susceptibility level was found against five pyrethroids tested between the flies from the 15th dumping-island and WHO standard susceptible strain, as shown in Table 2.

Table 2. LD₅₀ values in micrograms per female fly to pyrethroids

Insecticides	WHO/IN (SRS)	15th dumping-island (1972)
Pyrethrins	0.197	0.170
Allethrin	0.201	0.220
Phthalthrin	0.162	0.168
Butethrin	0.055	0.064
Resmethrin	0.019	0.020

ACKNOWLEDGEMENTS

The author wishes to express his hearty thanks to Dr. S. Asahina for his encouragement. He also thanks to Public Cleansing Bureau, Tokyo Metropolitan Government for the assistance in collecting the test insects.

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摘 要

15号埋立地のイエバエの殺虫剤抵抗性について

新夢の島とも呼ばれる東京湾15号埋立地のイエバエの殺虫剤抵抗性について、1967, 69, 71, および72年の4回にわたって調査した結果をとりまとめた。Malathionは旧夢の島時代の1965年以降まったく使用されていないが、1971年には225 microgramという極度に大きなLD₅₀値に発達した。これは標準感受性系統の約950倍の強さである。また、1972年のコロニーは、diazinonで103倍、fenitrothionで91倍、fenthionで62.5倍、dichlorvosで17倍の抵抗性比を示したが、pyrethroid系殺虫剤に対しては交差抵抗性が認められなかった。