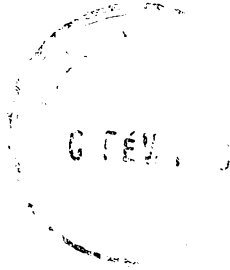


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SEASONAL VARIATIONS IN SUSCEPTIBILITY TO DDT OF
A. SERGENTI LARVAE IN JORDAN

by

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Reports on seasonal variations of susceptibility of adult mosquitos to insecticides have already been published,^{1,2} but seasonal variation in susceptibility of anopheline larvae has not hitherto been reported. The present paper summarizes the results of susceptibility tests carried out on A. sergenti larvae in different seasons in Jordan.

Third and fourth stage larvae were collected from an area having no history of application of residual insecticides. Tests to determine susceptibility to DDT were performed in the laboratory following the techniques suggested by Brown³ and later according to WHO instructions.⁴ In both cases counts were taken after 24 hours and all larvae showing movement on probing with a needle, i.e. alive or moribund, were counted as alive.^a The following table gives the results of tests carried out on larvae from the same breeding place in early November 1956, late November 1957, December 1957 and January 1958.

^a The WHO method of reading the results has been changed since this work was done, and moribund larvae are now counted as dead.

TABLE 1. MORTALITIES BY DDT EXPOSURE OF A. SERGENTI LARVAE IN DIFFERENT SEASONS

(Numbers of larvae are given in brackets)

DDT Conc. p.p.m.	24-hour mortality, per cent. (corrected)			
	Early Nov. 1956	Late Nov. 1957	Dec. 1957	Jan. 1958
	Temp. 74°F	63°F	63.5°F	57.5°F
0.001	61 (49)			
0.0025	74 (142)			
0.004		38 (110)		5 (60)
0.005	91 (188)			
0.01	98 (196)			
0.02		65 (108)	26 (28)	44 (62)
0.025	92 (100)			
0.05	100 (50)			
0.1		84 (83)	92 (27)	73 (60)
Control	25 (195)	1 (80)	18 (28)	0 (59)
LC50	0.001 p.p.m.	0.010 p.p.m.	0.034 p.p.m.	0.032 p.p.m.

The above table suggests that susceptibility to DDT in A. sergenti larvae decreases towards the end of November and that the larvae are least susceptible in winter (December and January).

Similar tests were carried out on larvae from other parts in Jordan, whether uncontrolled, or under DDT weekly larvicidal control from April to November every year, or treated with dieldrin once only. Results in all cases showed low mortalities during winter (Table 2) as compared to early November (in an uncontrolled area) or to May (in a controlled area).

TABLE 2. MORTALITIES BY DDT EXPOSURE OF A. SERGENTII
LARVAE IN CONTROLLED AND UNCONTROLLED AREAS

(Numbers of larvae are given in brackets)

DDT Conc. p.p.m.	24-hour mortality, per cent. (uncorrected)				
	<u>Mendessah</u> Area under Control	<u>Fassayil Spring</u> Non-controlled Area	<u>Fashkha</u> Area treated residually with dieldrin once only	<u>Ghor Nimrin</u> Area under Control	<u>Karameh</u> Area under Control
	Jan. 1957	Feb. 1957	Feb. 1957	March 1958	May 1957
	Temp. 68°F	66°F	70°F	65°F	80°F
0.0025	0 (50)	14 (22)	8 (25)		92 (24)
0.004				6 (81)	
0.005	0 (50)	17 (24)	6 (48)		83 (24)
0.02				40 (88)	
0.025	0 (26)		19 (48)		
0.05	4 (25)		26 (74)		100 (25)
0.1	8 (25)			44 (84)	
Control	0 (100)	4 (26)	8 (75)	6 (78)	4 (25)
LC50	>0.1 p.p.m.	>0.005 p.p.m.	>0.05 p.p.m.	>0.1 p.p.m.	<0.0025 p.p.m.

It is concluded that significant variations occur in the mortality from a given concentration of DDT at different seasons. This may be directly related to temperature, low test temperatures lowering the susceptibility of the larvae, or it may be that over-wintering larvae (which appear to lie dormant at the bottom for long periods) are physiologically less susceptible than others to insecticides. If feeding is diminished or arrested by winter conditions the dose picked up during 24 hours' exposure is presumably much smaller than that received by an active larva in the same concentration.

Whatever the reason for the lower kills in winter, they show that larviciding might prove less effective in interrupting winter malaria transmission than summer transmission in Jordan.

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