activity, such as extended informational bibliographical summarizing, procurement, preparatory, and interpretation services. Literature would be more systematically filed in the library and would be better distributed among the units using the library. Elimination of thousands of journal titles and complicated reference procedures and the provision of prepared references and simplified citation would greatly reduce effort.

Research progress would be accelerated, because universal availability, greater facility in documentation, and improved correlation of information from individual contributions would give new value to the scientific literature. Duplication of research efforts and of the functions of the information services would be reduced, and over-all research planning would be greatly facilitated. Research activities could be extended and improved at greater distances from the great centers, and the problem of international exchange and dissemination of scientific literature would be resolved.

A challenging functional objective for an expanded world association of scientists would be provided, contributing toward a further unification of the activities of scientists, raising the prestige of science and the scientific method, and, incidentally, engendering closer social and political unity throughout the world.

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Technical Papers

The Resistance of DDT-resistant Drosophila to Other Insecticides[1]

Richard Weiner and James F. Crow

Departments of Zoology and Genetics, University of Wisconsin, Madison

The literature of the past few years contains many examples of the development of strains of insects resistant to various insecticides. This resistance has been explained on the basis of the intense selection that occurs in treated areas. There is some variation in the results reported on the specificity of the resistance. Whereas early reports refer to a general hardiness with resistance extended from DDT to other insecticides (*1*), or to a specific resistance to DDT and very closely related compounds (*2*), the more recent investigations indicate that cross-resistance in DDT-resistant houseflies is neither highly specific nor broadly general, but of an intermediate nature (*3, 4*).

The purpose of this investigation was to determine the extent of the resistance of DDT-resistant *Drosophila melanogaster* to other contact poisons. Drosophila were used as test insects because of the ease with which they can be reared in large numbers in the laboratory and because of the possibility of much more precise genetic analysis than would be possible with any other species. The resistant strain was obtained by growing the flies in a Teissier-type population cage (*5*). This enables the growing of a virtually undisturbed population of a few thousand flies with a continuously changing food supply.

Fine crystals of DDT were scattered in the cage in gradually increasing amounts as the flies became more resistant. At the end of a year, only about 5% were killed by a concentration of DDT that killed about 95% of the control flies. This selection procedure is not as efficient as could be used, particularly because of the uniformly greater susceptibility of males, and a more rapid increase in resistance undoubtedly could have been obtained by better selection methods. But it appeared to be the most nearly comparable to the situation as it occurs in nature and was adopted for that reason.

The flies to be tested were the descendants of flies taken from the selection cages and from a control population. They were tested at an age of 4 days with 5 doses of the insecticide to be tested. The dosage levels were equally spaced logarithmically, 150 flies of each sex and strain being tested at each dosage level. The insecticides were prepared as acetone solutions, and 0.5 ml of the solution was pipetted onto a rectangular filter paper 6 × 7 cm which was fitted into a glass vial. After the solution had dried, 20 flies of the same sex were placed in the vial at 26° C. Studies in this laboratory have shown that differences in hu-

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TABLE 1

MEDIAN LETHAL CONCENTRATIONS ($\mu g/cm^2$) FOR DDT-RESISTANT AND SUSCEPTIBLE DROSOPHILA

	Females			Males		
	Resistant (R)	Control (C)	Ratio (R/C)	Resistant (R)	Control (C)	Ratio (R/C)
DDT	2670	830	3.22	2460	550	4.47
Other chlorinated insecticides						
DDD	48.1	28.1	1.71	43.0	27.0	1.63
Lindane	0.141	0.0611	2.30	0.105	0.0447	2.34
118	0.0237	0.0199	1.19	0.0207	0.0148	1.40
Toxophene	2.98	1.85	1.61	1.66	1.09	1.53
Methoxychlor	23.9	15.9	1.50	21.7	14.2	1.52
Nonchlorinated insecticides						
Parathion	0.251	0.206	1.16	0.217	0.212	1.02
Sabadilla	1.11	1.18	0.94	1.12	1.10	1.02
Pyrethrum	122	127	.97	118	112	1.06
Nicotine	18.5	20.1	.92	18.6	17.1	1.09
TEPP	10.0	10.1	0.99	9.74	9.70	0.99

midity are responsible for great fluctuations in mortality; humidity was therefore kept constant at about 56%. At the end of 6 hr, the flies were removed and placed in food vials, and mortality counts were recorded 24 hr later. The reason for selecting 6 hr as the time of treatment is the peculiar shape of the dosage-response curves with DDT at longer periods of exposure, a relation which makes quantitative interpretation difficult.

Tests were made with 10 insecticides other than DDT. These were DDD, Lindane (benzene hexachloride), 118 ("Aldrin"), toxophene, methoxychlor, parathion, sabadilla, pyrethrum, nicotine, and TEPP (tetraethylpyrophosphate). Commercial grades were used. The DDT was a highly purified product furnished by E. I. du Pont de Nemours & Co.

The results of these tests are shown in Table 1 and Fig. 1. The median lethal dose was determined for most insecticides by Karber's method, which under certain assumptions provides a maximum likelihood solution (*6*). When this method was not applicable, the Fisher-Bliss maximum likelihood method was used (*7*). The LD_{50} is given in μg of insecticide/cm^2 of filter paper area.

About 4 times the DDT concentration was required for the resistant strain as for the susceptible strain from which it was derived. As can be seen from the table, the first 5 of the other insecticides tested showed a similar, but lesser, differential mortality between the 2 strains. All these are chlorinated compounds. On the other hand, there was no significant difference in the response of the 2 strains to the 5 nonchlorinated compounds. Thus it appears that when flies are selected for resistance to DDT there is some carry-over of resistance to other chlorinated compounds, but very little, if any, to other contact insecticides.

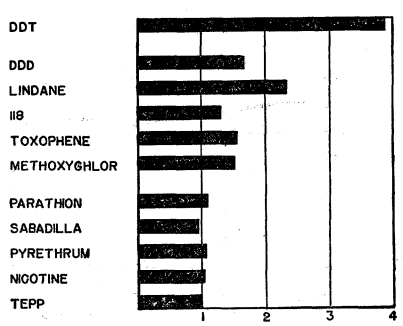

FIG. 1. Ratio of median lethal concentrations for resistant and control strains of Drosophila (av of both sexes).

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The Relation of Oxygen Uptake to Hemoglobin Synthesis[1]

Jonas E. Richmond, Kurt I. Altman, and Kurt Salomon

Departments of Radiation Biology and Biochemistry, University of Rochester School of Medicine and Dentistry, Rochester, New York

During an as yet unpublished investigation of the capacity of bone marrow of normal and x-radiated rabbits to form hemoglobin, measurements of oxygen consumption during the first 3 hr of a 24-hr incubation period were carried out. Bone marrows of normal rabbits and of rabbits exposed to 800 r of x-rays were

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