RESISTANCE TO
GAMMA-HEXACHLOROCYCLOHEXANE
IN MUSCA DOMESTICA L.

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I. INTRODUCTION

The increasing influence of mankind on nature for the maintenance of his food supplies and health has brought about considerable changes in the conditions of life of many organisms. Some species succeed in adapting themselves to the new circumstances, undergoing changes that enable them to retain their normal abundance. These changes can be of different kinds. A well-known example in entomology is the occurrence of resistant strains after a period of successful chemical control. This alteration in the environment is very simple, as it consists only of the introduction of a single compound. The development of resistance to poisons is therefore an ideal subject for the study of the process of adaptation. The control of insects can be looked upon as an enormous selection experiment, the scale of which largely compensates for the fact that its conditions are not always too well known. For that reason the resistant populations developed by the use of insecticides in the field are an interesting material for the study of genetical and physiological changes that have occurred.

Research in this field is not only of purely scientific interest, it is also of economic importance. In order to be successful in the control of insect pests we clearly are in need of a better insight into the problems of resistance. The prevention of the development of resistance and the control of insect populations that are already resistant have to be studied. These resistant populations offer a suitable subject for research on these problems.

The development of resistance resulting from chemical control in entomology has already been known for a long time. The outstanding examples, however, have more recently appeared as a result of the use of the chlorinated hydrocarbons, such as DDT and γ-HCH. The most striking case is the rapid development of a very high degree of resistance in the housefly, first to DDT, later to a whole series of other toxicants. As the housefly is at the same time a very suitable experimental animal, most of the investigations concerning resistance have been made with that insect. Work has mainly been done on DDT resistance because it was the first to appear and the technical possibilities were comparatively favourable. Although this resistance is by no means completely explained, many interesting results have so far been obtained.

Resistance to other substances has hardly been looked into. Yet, more information on the resistance to other insecticides in Musca would be very desirable. On the one hand, the easy development of resistance to a whole group of chlorinated hydrocarbons points to the involvement of some common factor. On the other, there is strong evidence that the mechanisms by which resistance is brought about are not the same for