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Comparative Study on Fitness History of Drosophila and Metamorphosis Drosophila

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ABSTRACT: Our current work aims to investigate the fitness history of Drosophila and Metamorphosis Drosophila.Drosophila is a small fly from the family Drosophilidae and its members are often called "FRUIT FLIES". The entire genus, however, contains roughly 1,500 species and have wide diversity in terms of appearance, behavior, and breeding habitat. One species of Drosophila in particular D. melanogaster, has been heavily used in research in genetics and is a common model organism in developmental biology. Basic genetic mechanisms are shared by most organisms. Therefore, it is only necessary to study the genetic mechanisms of a few organisms in order to understand how the mechanisms work in many organisms, including humans. Drosophila melanogaster, the fruit fly a little insect about 3mm long, is an excellent organism to study genetic mechanisms. The general principles of gene transmission, linkage, sex determination, genetic interactions; molecular, biochemical and developmental genetics, chromosomal aberrations, penetrance and expressivity, and evolutionary change may all be admirably demonstrated by using the fruit fly Drosophila melanogaster. Discrete genes regulated different aspects of development. Many of these genes turned out to be homologous to those involved in human development and disease. These genes had been conserved over millions of years of evolution and could be studied easily and rapidly in flies. This led to a boom in the field as more and more researchers saw the potential of flies for asking basic and applied questions, and to the development of ever cleverer molecular tools to address these questions. For example, chemical mutagenesis was used for many years to generate new mutations that were screened for interesting phenotypes, followed by careful genetic mapping, a chromosome walk, and finally gene cloning . Currently, the MiMIC transposon system is being applied to target all genes in the Drosophila genome, providing null mutations and a platform to land protein tagging, gene expression tracking.

I. INTRODUCTION:

Drosophila derived from the Greek word drósos meaning dew loving. Drosophila melanogaster is a fruit fly, of the kind that accumulates around spoiled fruit. It is also one of the most valuable organisms in biological research, particularly in genetics and developmental biology. Basic genetic mechanisms are shared by most organisms. Therefore, it is only necessary to study the genetic mechanisms of a few organisms in order to understand how the mechanisms work in many organisms, including humans. Drosophila melanogaster, a little insect about 3mm long, is an excellent organism to study genetic mechanisms. The general principles of gene transmission, linkage, sex determination, genetic interactions; molecular, biochemical and developmental genetics, chromosomal aberrations, penetrance and expressivity, and evolutionary change may all be admirably demonstrated by using the fruit fly. D. melanogaster and its hundreds of related species have been extensively studied for decades, and there is extensive literature available . The extensive knowledge of the genetics of D. melanogaster and the long-term experimental experience with this organism together with extensive genetic homology to mammals has made it of unique usefulness in mutation research and genetic toxicology. Many Drosophila genes are homologous to human genes and are studied to gain a better understanding of what role these proteins have in human beings . Much research about the genetics of Drosophila over the last 50 years has resulted in a wealth of reference literature and knowledge about hundreds of its genes. It is an ideal organism for several reasons: 1) Fruit flies are hardy with simple food requirements and occupy little space. In the current study it has been emphasized how Drosophila is currently being used, and what directions they think the system is moving in. From human disease modeling to the N-dissection of cellular morphogenesis and to behavior and aging, this work examines the current

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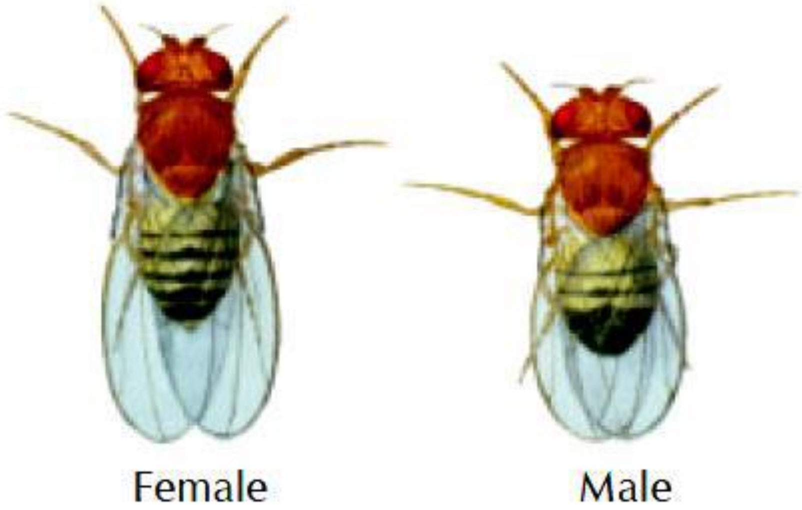
uses of flies, and the influence of fly research on other models.



Fig(1): Male and Female adult D. melanogaster

Methodology of Fitness in Drosophila and Metamorphosis Drosophila

The concept of fitness has played a key role in the development of evolutionary biology as a discipline despite fundamental disagreement over what it means and how it should be measured. Recent investigations have served to corroborate the admonition of that it can be misleading to attempt to infer total fitness from individual components of fitness. For example, viability alone has been shown to be a poor indicator of fitness [and the simultaneous study of viability and fertility has proved unsatisfactory [6, 9] largely because of pleiotropic effects . Sexual selection, a component usually not distinguished from fertility, has been shown to be important to fitness . Moreover, the conditions under which fitness is estimated (such as density and temperature) can influence the results obtained . Clearly then, any study of fitness must include as much of the life cycle as possible. The assessment should be done, at least initially, under uniform environmental conditions. Also, one must have an operational definition of fitness, if only for comparative purposes. Lastly, these desires must be fulfilled within a manageable experimental regime. We have chosen to examine several experimental techniques that have been devised for estimating total or net fitness in Drosophila melanogaster. Because these are estimates of total or net fitness encompassing at least one complete generation, they can satisfy the above-mentioned conditions while avoiding the problems of component analyses. These techniques all operationally define fitness in terms of competitive ability, or reproductive success under competitive conditions. They are relative measures in that they assess the fitness of a strain or population relative to some standard. We treat the terms “strain” and “population” as interchangeable from an experimental point of view. The set of D. melanogaster strains subjected to these analyses include lines homozygous for chromosome 2, lines heterozygous for chromosome 2, wild type lines of varied geographic origin and lines that have been sib-mated for several generations. By subjecting the same set of strains to each of these techniques, comparisons can be made in an effort to determine what is being measured and if the same thing is being measured inthese types of analyses. Although the net parameter measured in each of these techniques is referred to as “fitness”, at least for the strains tested they are not necessarily measuring the same thing .

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Sex combs in male fly

II. CONCLUSION:

The wide known information of the genetics of D. melanogaster and the prolonged experimental results with this organism together with extensive genetic homology to mammals has made it of immensely useful in mutation research and genetic toxicology. Many of the Drosophila genes are homologous to human genes and are used to gain a better understanding of what role these proteins have in human beings. Much research about the genetics of Drosophila Metamorphosis Drosophila over the last 50 years has resulted in a wide variety of reference literature and knowledge about hundreds of its genes. Also, the offspring are produced in large numbers which provide statistically significant data and phenotypic mutant changes are easily recognizable under the microscope.

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