



DROSOPHILA IN CLASSROOM : SIMPLE EXPERIMENTS TO UNDERSTAND DEVELOPMENT , BEHAVIOUR AND GENETICS



Khushi Srivastava*, Arukshita Tyagi, Srijan Singh , Yasha Yadav* & Pooja Suman

Department of Zoology , Miranda House , University of Delhi

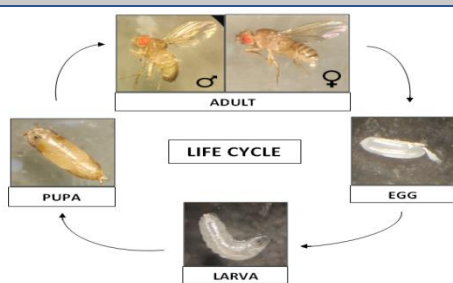
* ksrivastava2604@gmail.com

* beingyasha16@gmail.com

ABSTRACT

Drosophila melanogaster is one of the most well studied model organisms. They are easy to culture and their short life span makes them the most favoured model to study life cycle. High sugar diet causes obesity in larva of fruit fly. The adult fly are either WildType with Red eye or Mutant type with White eye. White eye colour is recessive character. Cross between the two determines the genotype of parentflies. All red flies in F1 generation infer Homozygous Wild type Female fly and Mutant Male fly. While both type F1 generation infer Heterozygous Wild type fly and Mutant Male fly.

INTRODUCTION



The common fruit fly gets its scientific name *Drosophila melanogaster* from the Latin words *Drosophila* meaning 'dew loving' and *melanogaster* meaning 'melanized abdomen'. *D. melanogaster* continues to be widely used in genetics, physiology, life history evolution and microbial pathogenesis. Research on drosophila has won many awards including 8 Nobel prizes.

Easy culture and short lifecycle of 12 days

Breed quickly and gives a large no. of offspring

Best studied model organisms

Easy to manipulate small genome, used in genetic analysis

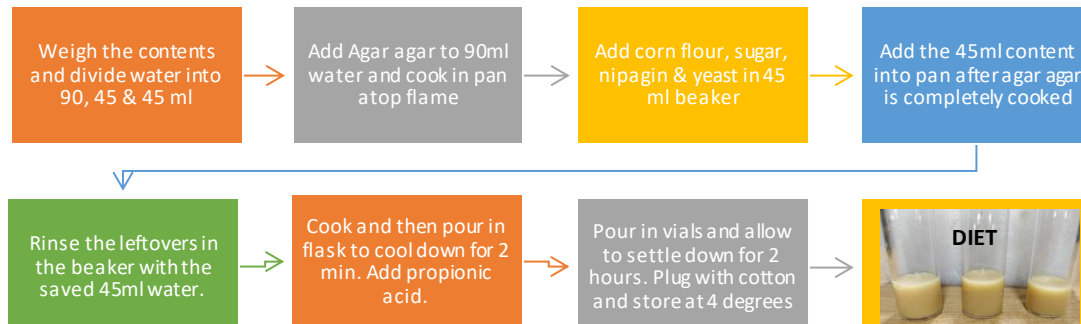
Adults show sexual dimorphism

MATERIAL AND METHEDODOLOGY

DIET PREPARATION

Contents:

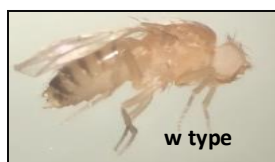
- Water -180ml
- Corn flour -8.5 g
- Agar-agar -1.25g
- Yeast -3g
- Nepagin -0.5g
- Propionic acid-0.5ml
- Sugar:
normal diet- 7.5g
high sugar diet- 10g
low sugar diet- 5g



Drosophila culture

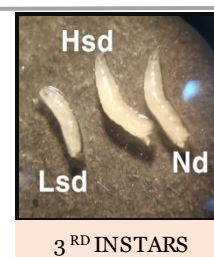
GENOTYPE IDENTIFICATION:

Two cross with 6 females and 3 males to study their genotype by analysis of F1 generation.



ANOVA:

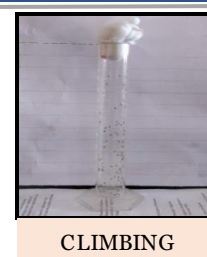
Variation in width and length of third instar, climbing behaviour & egg count due to changes in sugar concentration of diet is analysed using ANOVA in MS Excel 2007



3RD INSTARS



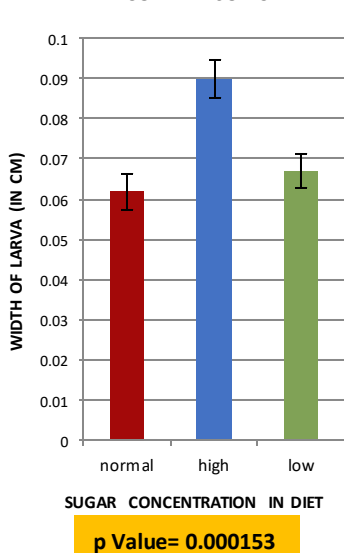
EGGS



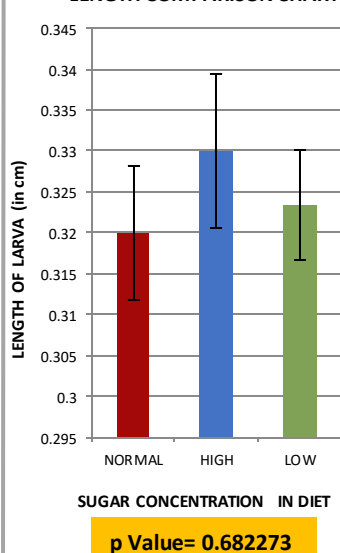
CLIMBING ASSAY

RESULT & DISCUSSION

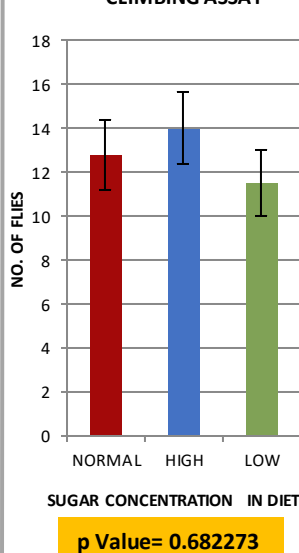
WIDTH COMPARISON CHART



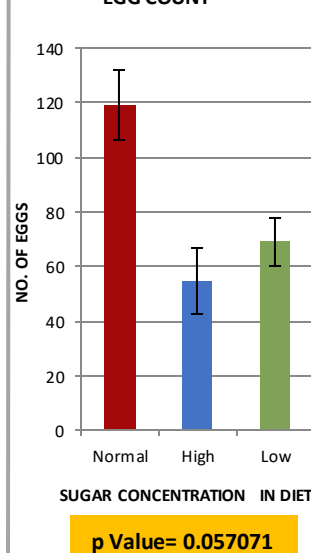
LENGTH COMPARISON CHART



CLIMBING ASSAY



EGG COUNT



GENOTYPE IDENTIFIED

The no. of flies in F1 generation in
 - Cross 1 – Mutant Male - 0, Mutant Female-0, Wild Male – 55, Wild Female – 44
 Possible genotype of parent flies in this case: Female Wild type fly **homozygous** and Male Mutant type fly.
 - Cross 2 – Mutant Male -7, Mutant Female -9 Wild Male – 50, Wild Female – 51
 Possible genotype of parent flies in this case: Female Wild type **heterozygous** and Male Mutant type
 ❖ This determination of genotype is based on the fact that eye colour gene is present on X chromosome i.e. it is sex linked.

ACKNOWLEDGEMENT

I sincerely thank Ms. Yasha Yadav and Dr. Pooja Suman for their guidance and support. I would also like to thank Dr. Bijaylaxmi Nanda (Principal, Miranda House), Dr. Simran Jit (TIC, Zoology Department, Miranda House), Dr. Sadhna Sharma (Head, DBT Star College scheme, Zoology) for giving me this opportunity. Last but not least, I would like to thank Prof. Namita Agrawal (Department of Zoology, DU) for providing *Drosophila* cultures.

REFERENCE

- Musselman, L., *et al.*, 2011. A high sugar diet produces obesity and insulin resistance in wild type *Drosophila*, *Disease models and mechanics*, 842-849.
- Cook, R., Cook, A., 1975. The attractiveness to males of female *Drosophila melanogaster*: Effects of mating, age and diet, *Anim. Behav.*, XXIII(III), 521-526.
- Vijendravarma, R., Narasimha, S., Kaweck, T., 2010. Effects of parental larval diet on egg size and offspring traits in *Drosophila*, *Biol. Lett.*, VI, 238-241.