

# A Study on the Trans-generational Effect of Paternal Social Environment on Male Offspring using *Drosophila Melanogaster* Model System

Purbasha Das Gupta<sup>1</sup> and Bodhisatta Nandy<sup>2\*</sup>

<sup>1,2</sup>Department of Zoology, BHU, Varanasi-221005, India  
E-mail: \*nbodhi84@gmail.com

---

**Abstract**—Evidences suggest that males in some species respond to changed intensity of competition by showing plasticity in their reproductive behaviour. This change in intensity of competition may occur due to variation in the social environment (presence of rivals). Recent evidences also suggest that environment experienced by fathers can have important consequences for the phenotype and fitness of offspring. Theory predicts that if parental environment is a good predictor of the environment in the next generation, then it is adaptive for the father to optimize offspring phenotype relevant to the environment. Using laboratory adapted populations of *Drosophila melanogaster*, we tested if fathers' experience of risk and intensity of sperm competition affects sons' reproductive behaviour and fitness component. Sons sired by the males held with more number of competitors prior to mating showed longer copulation duration. However, no significant effect of paternal perception of risk of sperm competition was found on the sons' fitness, their mating latency and ability to induce mating fidelity to their mates. Non-genetic mode of inheritance (probably, epigenetic) is predicted to be the probable cause for the observed trans-generational effect of paternal social environment on their sons' reproductive behaviour.