

Inversion polymorphism and extra bristles in Indian natural populations of *Drosophila ananassae*: joint variation

APARUP DAS*, SUJATA MOHANTY† & B. B. PARIDA

Genetics Laboratory, Department of Zoology, Utkal University, Bhubaneswar-751 004, India

Five Indian natural populations of *Drosophila ananassae* were analysed for chromosome inversions and the presence of individuals with extra scutellar bristles in the F₁ progeny of isofemale lines initiated from naturally impregnated females. Three commonly occurring inversions were found in these populations with varying frequencies as was the number of individuals with extra bristles (e.b.). Female individuals were more often found to carry extra scutellar bristles than were males. This result reveals that polygenic loci responsible for the determination of e.b. are widespread in Indian natural populations of *D. ananassae*. A significant positive correlation between the inversion frequency and the number of individuals with e.b. was detected in the isofemale lines of all the five populations. The 2L inversion, alpha, was found to be closely associated with individuals with the e.b. phenotype. The observed results are compared with earlier results obtained for *D. melanogaster*. The association of the alpha inversion with the e.b. phenotype is discussed in relation to chromosomal evolution in the *melanogaster* species group.

Keywords: *Drosophila ananassae*, extra scutellar bristles, inversion polymorphism, sex difference.

Introduction

Inversion polymorphism is clearly a part of the adaptive machinery in natural populations of *Drosophila*. Several species of *Drosophila* have been screened worldwide for this phenomenon and different situations have been found to exist. In India, two cosmopolitan species of *Drosophila*, *D. melanogaster* and *D. ananassae*, have been widely investigated for chromosome inversion polymorphism (Das, 1994 for a review). Although a considerable amount of genotypic variation is generally detected in natural populations, few differences in phenotypic characters are usually observed. It has been suggested that the genetic basis of phenotypic changes is fundamental for understanding the mechanism of evolution in natural and experimental populations (Lande, 1983) and the study of quantitative characters in wild populations could prove to be interesting for evolutionary studies (David *et al.*, 1977).

In *D. melanogaster*, it has been found that the scutellar phenotype is strongly canalized at four macrochaetae (bristles) and that the canalization is regulated by the scute locus (Rendel *et al.*, 1965). Also, it has been determined that the normal number of four scutellar bristles in *D. melanogaster* is often so tightly controlled developmentally that a change in visible phenotype occurs only after a considerable amount of gene substitution (Rendel *et al.*, 1965; Das & Singh, 1992). It also has been estimated that to alter the chaeta number from four to three or five takes about eight times as many genetic changes as to alter the number from three to one (Lee & Parsons, 1968). In natural populations of this species genetic variation for extra scutellar bristle phenotypes has been reported in India (Singh & Das, 1991), Spain (García-Vazquez *et al.*, 1989) and Austria (Lequendo *et al.*, 1991). In all these studies, chromosome inversions, especially In(3R)C, are found to be positively correlated with the extra bristle phenotypes.

Drosophila ananassae is a cosmopolitan and domestic species which occurs throughout the tropical regions of the world and is found in abundance in the Indian subcontinent. Studies on the population genetics of

*Correspondence.
†Present address: Department of Life Science, Regional College of Education (NCCERT), Bhubaneswar-751 007, India.

Drosophila Inversion Polymorphism

Louis Levine



Drosophila Inversion Polymorphism:

Drosophila Inversion Polymorphism Costas B. Krimbas, Jeffrey R. Powell, 1992-08-21 Inversion polymorphism in *Drosophila* has long served as a research subject for a variety of evolutionary studies and continues to be extremely important in understanding evolutionary principles today Until now no single volume has ever been assembled as a summary of this work *Drosophila Inversion Polymorphism* provides background information explores new and rigorous approaches to reconstructing phylogenetic relationships from inversion variation and discusses inversion polymorphism in the six most studied species groups Some chapters examine general principles and conclusions some present detailed data sets many of which have never before been published and others offer detailed chromosome maps for identification The book is a one of a kind source of summary discussions and data ripe for analysis Geneticists evolutionary biologists biologists and all investigators researching inversion polymorphisms should consider *Drosophila Inversion Polymorphism* a must have volume

Chromosomal Inversion Polymorphism in Drosophila Kin San Tam, 1984 [Inversion Polymorphism in Drosophila from South East Asia](#) Adrienne Kristina Pope, 1985 [The Maintenance of Inversion Polymorphism in Drosophila Melanogaster](#) Colin A.M. Semple, 1994 **The Maintenance of Inversion Polymorphism in Drosophila Melanogaster** Colin A. M. Semple, 1994 [Chromosome Inversion Polymorphisms in Drosophila Melanogaster](#) Wayne Robert Knibb, 1982 *Inversion Polymorphism in Drosophila Paranasuta* Mahani Mansor Clyde, 1988 *Chromosomal Inversion Polymorphism in Drosophila from Phuket, Thailand* Rosanne Elena Casu, 1987 [Chromosomal Inversion Polymorphism in the Southwestern Range of Drosophila Subobscura Distribution Area](#) Antoni Prevosti, 1974 **Evolutionary Genetics** R. S. Singh, Costas B. Krimbas, 2000-03-28 Richard Lewontin is undoubtedly one of the most distinguished evolutionary biologists of our time He has contributed to science not only by his own work on evolutionary theory and molecular variation and by his influence on the many young scientists who have worked with him but also by asking us to think about the relationships between the science we do and that world we do it in Sciences in general and the life sciences in particular need their own critic and Lewontin has been an untiring critic of science and its relevance to society This collection of essays first published in 2000 was produced in honour of Lewontin's 65th birthday The volume has a comprehensive coverage of modern evolutionary genetics from molecules to morphology by a group of star authors including his students and colleagues The areas covered are the mathematical and molecular foundations of population genetics molecular variation and evolution selection and genetic polymorphisms linkage and breeding system evolution quantitative genetics and phenotypic evolution gene flow and population structure speciation behaviour and ecology The volume brings out the central role of evolutionary genetics in all aspects of its connection to evolutionary biology and is a must for all graduate students and researchers in evolutionary biology **Insect Genomics** Mariangela Bonizzoni, Lino Ometto, 2025-08-19 This collection explores advances in genome sequencing and analysis tools for the understanding of insect genomes and hence their biology Beginning with obtaining a

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Fragata, Ana Sofia Quina, Torsten Nygaard Kristensen, Mauro Santos, 2021-02-22 [Inversion Polymorphism and Embryonic Lethality in *Drosophila Robusta*](#) Linda Smith Riles, 1962 **Zoological Studies**, 1998 *Encyclopedia of Evolutionary Biology*, 2016-04-14 *Encyclopedia of Evolutionary Biology Four Volume Set* is the definitive go to reference in the field of evolutionary biology. It provides a fully comprehensive review of the field in an easy to search structure. Under the collective leadership of fifteen distinguished section editors it is comprised of articles written by leading experts in the field providing a full review of the current status of each topic. The articles are up to date and fully illustrated with in text references that allow readers to easily access primary literature. While all entries are authoritative and valuable to those with advanced understanding of evolutionary biology they are also intended to be accessible to both advanced undergraduate and graduate students. Broad topics include the history of evolutionary biology, population genetics, quantitative genetics, speciation, life history, evolution, evolution of sex and mating systems, evolutionary biogeography, evolutionary developmental biology, molecular and genome evolution, coevolution, phylogenetic methods, microbial evolution, diversification of plants and fungi, diversification of animals and applied evolution. Presents fully comprehensive content allowing easy access to fundamental information and links to primary research. Contains concise articles by leading experts in the field that ensures current coverage of each topic. Provides ancillary learning tools like tables, illustrations and multimedia features to assist with the comprehension process. **The Indian Journal of Genetics & Plant Breeding**, 1941

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