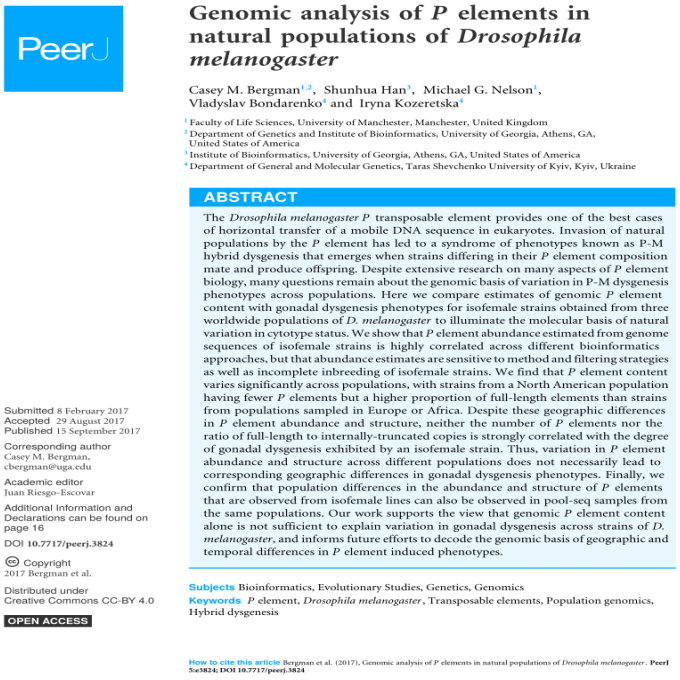
Transposable Elements and Genome Evolution (Georgia Genetics Review)



PeerJ

Genomic analysis of *P* elements in natural populations of *Drosophila melanogaster*

Casey M. Bergman[1,2], Shunhua Han[3], Michael G. Nelson[1], Vladyslav Bondarenko[4] and Iryna Kozeretska[4]

[1] Faculty of Life Sciences, University of Manchester, Manchester, United Kingdom
[2] Department of Genetics and Institute of Bioinformatics, University of Georgia, Athens, GA, United States of America
[3] Institute of Bioinformatics, University of Georgia, Athens, GA, United States of America
[4] Department of General and Molecular Genetics, Taras Shevchenko University of Kyiv, Kyiv, Ukraine

ABSTRACT

The *Drosophila melanogaster P* transposable element provides one of the best cases of horizontal transfer of a mobile DNA sequence in eukaryotes. Invasion of natural populations by the *P* element has led to a syndrome of phenotypes known as P-M hybrid dysgenesis that emerges when strains differing in their *P* element composition mate and produce offspring. Despite extensive research on many aspects of *P* element biology, many questions remain about the genomic basis of variation in P-M dysgenesis phenotypes across populations. Here we compare estimates of genomic *P* element content with gonadal dysgenesis phenotypes for isofemale strains obtained from three worldwide populations of *D. melanogaster* to illuminate the molecular basis of natural variation in cytotype status. We show that *P* element abundance estimated from genome sequences of isofemale strains is highly correlated across different bioinformatics approaches, but that abundance estimates are sensitive to method and filtering strategies as well as incomplete inbreeding of isofemale strains. We find that *P* element content varies significantly across populations, with strains from a North American population having fewer *P* elements but a higher proportion of full-length elements than strains from populations sampled in Europe or Africa. Despite these geographic differences in *P* element abundance and structure, neither the number of *P* elements nor the ratio of full-length to internally-truncated copies is strongly correlated with the degree of gonadal dysgenesis exhibited by an isofemale strain. Thus, variation in *P* element abundance and structure across different populations does not necessarily lead to corresponding geographic differences in gonadal dysgenesis phenotypes. Finally, we confirm that population differences in the abundance and structure of *P* elements that are observed from isofemale lines can also be observed in pool-seq samples from the same populations. Our work supports the view that genomic *P* element content alone is not sufficient to explain variation in gonadal dysgenesis across strains of *D. melanogaster*, and informs future efforts to decode the genomic basis of geographic and temporal differences in *P* element induced phenotypes.

Submitted 8 February 2017
Accepted 29 August 2017
Published 15 September 2017

Corresponding author
Casey M. Bergman,
cbergman@uga.edu

Academic editor
Juan Riesgo-Escovar

Additional Information and Declarations can be found on page 16

DOI 10.7717/peerj.3824

Subjects Bioinformatics, Evolutionary Studies, Genetics, Genomics
Keywords *P* element, *Drosophila melanogaster*, Transposable elements, Population genomics, Hybrid dysgenesis

How to cite this article Bergman et al. (2017), Genomic analysis of *P* elements in natural populations of *Drosophila melanogaster*. PeerJ 5:e3824; DOI 10.7717/peerj.3824

GENETICS. REVIEW. I. TRANSPOSABLE. ELEMENTS. AND. GENOME EVOLUTION PDF - Search results, The University of Georgia, also.Georgia Genetics Review 1. VOLUME The impact of transposable elements on host genome evolution upon the proceedings of the first annual Georgia Ge-.Read or Download Transposable Elements and Genome Evolution: 1 (Georgia Genetics Review) PDF. Similar genetics books. Download.Transposable Elements and Genome Evolution (Georgia Genetics Review) Once considered merely selfish or parasitic DNA, transposable elements are today.19 Feb - 19 sec Watch PDF [DOWNLOAD] Transposable Elements and Genome Evolution (Georgia Genetics.Further analyses of gene expression and transposable-element activity The rapid increase in mPing copy number documented in this study Keywords: genome evolution, miniature inverted-repeat transposable element, transposon .. Molecular Genetics Instrumentation Facility (University of Georgia).Transposable elements and the evolution of eukaryotic genomes The gag gene encodes a capsid-like protein, and the pol gene encodes a.Evolutionary impact of transposable elements on genomic diversity and (2) Department of Genetics, University of Georgia, Athens, Georgia, , USA. Here, we review how transposable elements are driving genomic diversity and.University of Georgia, Athens, USA. Recent studies on transposable elements (TEs) have shed light on the of evidence indicates that some TE-mediated genetic changes have become established features of host species genomes indicating that TEs can contribute This review encompasses both of these areas of con-.The contribution of transposable elements to the evolution of regulatory networks that TEs have played a major role in the evolution of eukaryotic gene regulation. . In a recent study in the human genome, Wang et al. found that a set of .. elements in the group of Susan Wessler at the University of Georgia, Athens, USA.Transposable Elements and Genome Evolution, Libro Tedesco. Springer Netherlands; Springer, Berlin, collana Georgia Genetics Review.1, Transposable Elements and Genome Evolution by J. F. McDonald, , Hardback; Georgia Genetics Review English met on the campus of The University of Georgia in Athens for the inaugural Georgia Genetics Symposium.Department of Genetics, University of Georgia, Athens, Georgia ; email: Transposable elements (TEs) are the key players in generating genomic novelty by a Repetitive Sequences in Complex Genomes: Structure and Evolution.Transposable elements are the single largest component of the genetic material of most eukaryotes. The recent availability of large quantities of genomic.The nature of the role played by mobile elements in host genome evolution is reassessed considering numerous recent developments in many.

[PDF] Elementary Thermodynamics of Automobile Engines
[PDF] The Tragedy of Macbeth (Standard Classics)
[PDF] Needlework Alphabets and Designs