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In evolutionary biology, speciation being gradual or punctuated remains as a fundamental question and the poor availability of evolutionary history of most plant and animal species makes the critical evaluation of this question a difficulty. Hybrid or “recombinational” speciation is one of the suggested pathways by which new species might arise rapidly via hybridization between chromosomally or genetically divergent parental species. *Drosophila nasuta nasuta* (2n=8) and *D. n. albomicans* (2n=6) are a pair of chromosomal cross fertile races belong to the *nasuta* subgroup of *immigrans* species group of *Drosophila*. Interracial hybridization between them resulted in the production of karyotypically stabilized hybrid races called cytoraces. The parents and the newly evolved 16 cytoraces are grouped under a new assemblage called, “*nasuta-albomicans*” complex (NAC) of *Drosophila*. This complex is an artificial hybrid zone of *Drosophila* with “allosympatric” populations’ exhibits racial divergences. In view of this, these members were subjected for genetic analysis to understand the molecular basis of introgression. The findings and their implications are presented in three sections. Section I reviewed the published literature about the members of NAC of *Drosophila* and the molecular markers.

In Section II the evolutionary genetics of Fissioncytorace-1 was dealt in 5 parts as (A) Phenomes (B) Inter-genotypic competitive ability assessment (C) Random Amplified Polymorphic DNA (RAPD) analysis (D) Microsatellite analysis and (E) Inter Simple Sequence Repeats (ISSR) analysis. Fissioncytorace-1 showed increased body size, sternopleural bristle number, ovarioles number, lifetime fecundity and lifetime fertility with reduced inter-specific competitive ability and hatching success when compared to cytorace 1. RAPD, microsatellite and ISSR
analyses placed cytorace 1 and Fissioncytorace-1 in one cluster indicating that though both differ in their chromosome number, at the genomic level, they are identical. This suggests that introgressed chromosomes of cytorace 1 in Fissioncytorace-1 stay stable even after the 15 years of its origin; however, its morphophenotypes and fitness are superior than cytorace 1. This implies that the phenotypic and fitness traits evolve rapidly than the genotypic divergence in the cytorace 1 and Fissioncytorace-1.

In Section III, genomic introgression in a few members of the NAC of Drosophila was addressed. Among the cytoraces, the Cytorace 1 is competitively superior over the other three cytoraces, while cytorace 3 showed the lowest competitive ability. RAPD, microsatellites and ISSR analyses consistently revealed that D. n. albomicans genome was introgressed more into the genome of cytoraces than D. n. nasuta along with the new alleles of their own. A single, distinct STS marker was developed which is specific to NAC of Drosophila. The interesting observation is that in each of the molecular assessment in these cytoraces, D. n. albomicans contributes more of its genome. This suggests that hybrid recombination and introgression of more of D. n. albomicans chromosomes in the cytoraces supports an evidence for “recombinational speciation” in the evolution of cytoraces. Therefore, ~25 years old hybridization, hybrid recombination and maintenance brought about the rapid changes in cytoraces of NAC of Drosophila.

Thus, one can conclude that hybridization and recombination are the catalyst to enhance the rate of variation and in turn evolution. Further, the STS markers would help us to identify the introgressing blocks from the chromosomes of both the parents, which will also bring out the genomic regions/genes involved in rapid evolution of genomes.