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Editorial

How to Survive in a Changing Environment

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The relationship between insects and humans has been more known as a run. The insects trying to survive and the humans trying to survive. Survive to an insect means moving from deteriorated environments to environments with more resources (shelter and food). For us, the human's, means environments without insects and with food. In the past years, agriculture was based on this paradigm. That is, the best agricultural management practices are often evaluated like the ones that keep the fields on insect-free.

The surprising fact is that the insect population that has suffering impacts on the equilibrium of natural conditions has the trend to select individual more adapted to the new conditions. This selection pressures imposed by several factors promotes adaptive evolution. In other words, the alleles favored by natural selection gradually replace those which are unfavored, changing populations from within.

In this point of the history, the systematic molecular study that includes changes in DNA sequence are important for the characterization of the natural selection history and genetic relationships among populations. Molecular markers, based on DNA-polymorphism are available today for researchers in sciences field. To study the diversity at the intraspecific level, several molecular techniques have been widely used, as RFLP, AFLP and microsatellite markers (SSRs). One insect that can be used as a model for this kind of study is sugarcane borer moth, Diatraea saccharalis. This pest is widespread throughout South and Central America, the Caribbean region, and the southern United States.

In Brazil, Diatraea saccharalis is the major pest in sugarcane and key pest in corn. These both crops are cultivated in a large diversity of environments, which differ in soil conditions, climate, availability and susceptibility of the variety and management control system. This multiplicity of conditions is characteristic of inconstant environments that exhibit a natural fragmentation of the ecosystems. The fragmentation process can lead to reduced effective insect population sizes and an increase in the mating between relatives, including in these facts the high ability of insects to demonstrate local adaptation and acceleration of the evolutionary process.

his theory reflects the Diatraea saccharalis population in Brazil, where there are preliminary indications that low interactions can be related to the fragmentation process between crop productions regions and may affect gene flow. The gene flow is impacted by the moth behavior, because the low dispersal capacity of this D. saccharalis and for the site fidelity, that suggest a more sedentary lifestyle in which mattings are mostly restricted to small groups of related insects.

In the end of the day, this process of adaptation by several reasons is leaving each local population to be different from the ancestral population. That is not a new information, the natural selection tells us about that "Organisms that are more adapted to their environment are more likely to survive and pass on the genes that aided their success". But in the case of sugarcane borer, the evolution process can be supported by molecular markers methods, that revealed the existence of well-defined groups or geographic structures. This information may help to refine the understanding of evolutionary aspects of insect pests to develop more effective and sustainable population management practices.