

Plant Genomics

July 14-15, 2016 Brisbane, Australia

Adaptive ecological incipient sympatric speciation of wild barley at "Evolution Canyon"

Eviatar Nevo

University of Haifa, Israel

Sympatric speciation (SS), the origin of new species within a free breeding population or contiguous populations has been under continuous controversy since first proposed by Darwin in his Origin. "Evolution Canyon" (EC) at Mount Carmel, Israel has been a fruitful microclimatic natural model for unraveling incipient adaptive ecological sympatric speciation across life from bacteria through plants and animals. EC consists of hot and dry, south facing, savannoid "African" slope (AS) abutting with a cool and humid, north-facing, forested "European" slope, separated on average by 250 meters. Here, I describe incipient adaptive SS in wild barley, *Hordeum spontaneum*, the progenitor of all world cultivated barley at EC, based on inter-slope divergent adaptive complexes, inferior inter-slope crosses than intra-slope crosses and sharply divergent RNA-seq and whole genome inter-slope contrasts. Inter-slope adaptive complexes include phenotypically, interslope divergent flowering time, early at AS and late at ES and genotypically, higher genetic polymorphism of allozyme and DNA diversities on AS, higher drought resistance on AS, based on dehydrins, rhizosphere bacteria, and Eib1 gene and higher resistance against rust fungi on ES. Wild barley at EC was domesticated by humans in Neolithic times and harbors important abiotic and biotic genetic resources for future cultivated barley improvement.

Biography

Eviatar Nevo has conducted local (in four natural laboratories of "Evolution Canyons" in Israel), regional (in Israel and the Near East Fertile Crescent as natural genetic laboratories), and global (across all continents as genetic labs) genetic studies, interdisciplinary linking genetics and ecology in terms of ecological genetics and ecological genomics, bridging genotypes and phenotypes, integrating molecular and organismal biology, organism-environment relationships and elucidating the patterns and causation of genetic diversity in nature. He has established the Environmental Theory of Genetic Diversity proposing that, generally, genetic polymorphism at all scales, local, regional and global, and across life, is positively correlated with and predictable by environmental stress. He has founded (1973) and directed the Institute of Evolution at the University of Haifa till October 2008. In 2005, he has established the International Graduate Center of Evolution with 77 PhD students from 13 countries, thus cultivating the future world leaders of biodiversity including genetic diversity. He has studied the effects of atomic radiation at the Chernobyl disaster and found numerous molecular mutations associated with cancer in the offspring of liquidators who cleaned the site and in those who were born after the event, indicating that the mutations have passed through the germ line from parents to offspring.

nevo@research.haifa.ac.il

Notes: