Population Genetic Analysis of Pomacea spp. in Subtropical Regions

The apple snail (*Pomacea spp.*) belongs to the Ampullariidae family within the Gastropoda class of mollusks. Originally native to the Amazon Basin, it was classified as one of the world's 100 most pernicious invasive species by the International Union for Conservation of Nature (IUCN) in 2000. This designation stemmed from the fact that apple snails harbor numerous high-risk parasites. Consequently, they have been widely abandoned and have escaped into the wild, posing a severe threat to agriculture and human health in the affected regions. Furthermore, the prolific reproduction of apple snails has caused varying degrees of disruption to aquatic ecosystems in the southern regions of China.

Apple snails will continue to demand focused attention in invasive species management for the foreseeable future. This calls for the transformation of traditional chemical control methods into more environmentally sustainable biological control strategies. Achieving this transformation necessitates a more profound understanding of the wild distribution, life cycle, and genetic structure of apple snails. Additionally, in the context of global warming, the remarkable tolerance of apple snails to extreme high and low temperatures and harsh aquatic environments suggests that they may further invade southern China and continue to expand northward. This notion is supported by various predictive models and observations in regions north of 30°N latitude.

Population genetics is a field that explores the genetic composition of populations, encompassing the distribution and fluctuations in genotype and phenotype frequencies during processes such as natural selection, genetic drift, mutation, and gene flow. As such, this study aims to conduct population resequencing and population genetic analysis of apple snail samples collected from Luocun, Shenzhen. Our objective is to gain a deeper insight into the genetic diversity and historical aspects of apple snail populations, thereby providing essential theoretical support for the future detection and control of apple snails.