Where Are They from? The Origin of Alien Cicada (Graptopsaltria bimaculata) in Izumi, Kagoshima, Japan

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In 2018, G. bimaculata was found in Izumi City, 600 km away from its native habitat. Since detailed morphological or DNA analysis was not yet available, this study was conducted with the aim of identifying the origin of Izumi population of G. bimaculata. Adult specimens were collected from both the Ryukyu Island habitat and Izumi City. Their morphologies were compared using scatter chart and principal component analysis. A phylogenetic tree was constructed based on mitochondrial DNA. Morphological and DNA analysis both showed that G. bimaculata in Izumi City was closely related to the Tokunoshima population. The study area where 133 exuviae were collected is a farm of transplanted trees from the south islands. This suggests that larvae were transferred from the Ryukyu Islands through transplantation. A large number of emergence of three consecutive years suggests that it has been a long time since G. bimaculata was introduced to Izumi City. DNA analysis showed that the populations of Amami and Tokunoshima diverged 500,000 years ago, and the population of Okinawa diverged from another population 1 million years ago. With further research it maybe possible to classify these divergent populations as a subspecies or a different species entirely. In addition, elucidation of the immigration route will be a countermeasure against alien species in the future. Our research will help the activities to protect native ecosystems.

Awards Won:
Fourth Award of $500
Sigma Xi, The Scientific Research Honor Society: Second Life Science Award of $1,000