Presence of Wolbachia in Wild Adult Lycorma delicatula

Horack, Erin (School: Conrad Weiser High School)

Lycorma delicatula (Spotted Lanternfly) has become prominent in the United States causing environmental and economic damages. It damages trees, including peach and apple trees, and crops, such as grapevines, by feeding on phloem sap. The Pennsylvania Department of Agriculture predicted L. delicatula damages to cost 18-20 billion dollars, prompting the need of effective eradication methods. The incompatible insect technique effectively reduced populations of Aedes aegypti (Yellow Fever Mosquito) by 97% without causing harm to surrounding ecosystems. This technique relies on cytoplasmic incompatibility (CI) which is caused by Wolbachia, a naturally occurring bacteria. CI caused by Wolbachia results in underdeveloped zygotes which leads to egg lethality. Males infected with Wolbachia that mate with un-infected females produce infected eggs. Embryos in infected eggs die. Since CI is caused when males are infected with Wolbachia and females are un-infected, this study determined the presence of Wolbachia in L. delicatula wild populations. The rapid spread of L. delicatula led to the hypothesis that L. delicatula do not contain Wolbachia and incompatible insect technique through Wolbachia could suppress L. delicatula populations. Polymerase Chain Reaction and electrophoresis on ten different L. delicatula determined that females do not contain Wolbachia, suggesting that infecting L. delicatula males could cause CI and a significant reduction in their population. Data showed no Wolbachia in female L. delicatula, one male contained Wolbachia. This rejects the hypothesis but supports the claim that L. delicatula populations contain an insignificant amount of Wolbachia opening the possibility of using it to suppress L. delicatula populations.

Awards Won: