Ovipositional ability of geographic poulations of Colorado potato beetle *Leptinotarsa decemlineata* on native and novel host

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Abstract

Host range expansion of invasive species may occur by rapid adaptive evolution or selection upon existing variation. In insects this may occur quickly, making them excellent models for studying the evolution of physiological traits which affect performance. The Colorado potato beetle, *Leptinotarsa decemlineata*, is an excellent model system for examining the genetics of host range expansion. The beetle is native to Mexico where it feeds on the wild hosts, *Solanum rostratum* and *Solanum angustifolium*. It expanded onto potato in the mid-1800s from its native solanaceous host becoming one of the most damaging pests of potato crops. Although they can feed on potato, Mexican beetles in the ancestral range of *L. decemlineata* perform poorly it. A lack of oviposition on potato may represent an inability to sexually mature on a novel host. Adult females are generally unable to oviposit on potato without first feeding on their native hosts. In this study, we asked: 1) Do beetle populations vary geographically in their ability to oviposit on potato and 2) how much do individual beetles vary within populations? We placed newly emerged beetles from populations in Vermont, Kansas and Texcoco, Mexico in male/female pairs on treatments of either a native (*S. rostratum*) or novel host (potato). We assessed the ovipositional ability and fitness of each female by counting the number of eggs laid per day for thirty days. Female beetles were dissected after thirty days to assess the reproductive maturation of the ovaries. Preliminary results reveal significant variation in the ability to oviposit on potato within the Texcoco population and Kansas populations. The ovaries of non-ovipositing females display a lack of development consistent with that of newly emerged beetles. These results suggest that there is significant geographic variation amongst beetles and within populations to explain the rapid expansion of the beetle onto potato.