

Garden Club of America, Wetland Scholarship Report
IT'S A BUG-EAT-BUG WORLD: THE ROLE OF A LADYBEETLE MEDIATED TRI-TROPHIC
CASCADE IN SOUTHERN CALIFORNIA SALT MARSHES

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Project Update:

In May of 2014, I began a long-term study to assess the impact of seaside ladybeetles on populations of armored scale insects and the salt marsh plant, California cordgrass. This project has shown that ladybeetles, through direct consumption, are able to control populations of armored scale insects. Additionally, by consuming large quantities of scale insects, ladybeetles may have a positive effect on cordgrass, by reducing the stress associated with scale insect infestations.

Observations of ladybeetles in salt marshes sparked additional investigation into optimal ladybeetle diet and prey selection. I noticed that once cordgrass flowered in the late summer, ladybeetles began to spend more time on cordgrass flowers than on scale insect-infested leaves. This led to a study assessing how cordgrass flowers alter ladybeetle feeding rates on scale insects. I found that in the presence of flowers, ladybeetles consume fewer scale insects per day. Therefore, it is likely that ladybeetles are consuming cordgrass pollen in addition to armored scale insects. I am currently using this information to determine which diet; scale insects, cordgrass flowers, or a mixed diet; is optimal for beetle survival and reproductive output. In addition to comparing beetle's consumption of scale insects and cordgrass pollen, I have also compared beetle consumption of adult versus juvenile scale insects. Here I found that ladybeetles prefer to consume adult, rather than juvenile, scale insects. Beetle preference for adult scale insects is likely due to adults housing eggs and un-emerged juvenile scale insects, making the consumption of one adult more beneficial than that of a single juvenile.

Summary of Expenses:

Funds awarded by the Garden Club of America were used to purchase essential field and laboratory gear: including tubs for laboratory microcosms, insect mesh, plastic plant pots, HOBOware temperature loggers and shuttle, and travel costs to field sites.