Effect of inter-specific competition and fish on the spatial distribution of *Gammarus fasciatus* and *Echinogammarus ischnus*

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Field collections in Hatchery Bay, Lake Erie, have shown differences in the spatial distribution of the native amphipod, G. fasciatus, and the exotic amphipod E. ischnus. G. fasciatus abundance is always higher in macrophyte beds than in zebra mussel colonies, while E. ischnus shows the opposite pattern. We conducted a lab experiment to investigate the habitat preference of G. fasciatus and E. ischnus in the presence and absence of interspecific competitors (each species alone vs. both species together). Our experimental design consisted of two habitat treatments: Tanks with no habitat structure (control) and tanks with two habitats, macrophytes and zebra mussels. We observed the number of amphipods in each habitat after 12 hours. Habitat structure had a significant effect on the spatial distribution of G. fasciatus and E. ischnus. In the control tanks both amphipods were evenly distributed. In the tanks with habitat structure, G. fasciatus abundance was higher in the macrophytes, while E. ischnus abundance was higher in the mussel beds. The amphipod spatial distribution was similar when incubated alone or together. These results suggest that differences in amphipod spatial distribution were not caused by interspecific competition. We also investigated the interactive effect of yellow perch and round goby on the spatial distribution of G. fasciatus and E. ischnus. In these experiments we used tanks with mussel and macrophyte habitat and added an equal number of E. ischnus and G. fasciatus. We had 4 treatments (round goby, yellow perch, round goby + yellow perch, and no fish) and two replicates/treatment. The experiment was conducted twice and lasted 12 hours. Fish were well fed prior to the introduction to the tanks to minimize predation on amphipod. The presence of fish did not have a significant effect on the spatial distribution of G. fasciatus or E. ischnus in the first experiment. In all treatments G. fasciatus abundance was higher in the macrophytes while E. ischnus abundance was higher in the mussels. In the second experiment, we observed similar trends in all the treatments except in yellow perch +round goby treatment, where abundance of both amphipods was higher in mussels than in macrophytes. Fish gut contents revealed that consumption rate was higher in this treatment (12% of amphipod consumed) than in the other treatments (< 6%). These results suggest that G. fasciatus and E. ischnus do not show a behavioral response to fish presence.