- **Project Title:** Ecosystem engineering and nutrient cycling effects of native and exotic species in the San Marcos River ecosystem

Investigator: Yixin Zhang

Department: Biology

Project Summary:

 Large-bodied animals in stream ecosystems, such as fish and macro-crustaceans, often play substantial roles in nutrient cycling and organic matter processing. However, little is known about the individual and combined impacts of native and non-native animals on stream ecosystem processes. We experimentally investigated the effects of exotic herbivorous suckermouth catfish (Hypostomus sp.) and native bigclaw river shrimp (Macrobrachium carcinus) on ecological processes in a stream channel system, which was designed to mimic natural condition with leaf litter packs and algal tiles open to grazing. We assessed detrital breakdown rate, organic matter accumulation, sediment movement, primary productivity, and transport of organic and inorganic matter downstream and the influence of these two species on benthic community composition. Our major experimental results indicated that (1) both M. carcinus and Hypostomus significantly reduced in organics ediment accumulation on tiles, because Hypostomus and M. carcinus are both active, benthic foragers, and direct contact with the benthos serves as a mechanism for the distribution of matter downstream and into the water column; (2) Hypostomus as an algal scraper had a significant effect on reducing Chl a on substrate, (3) Hypostomus accrued significantly more sediment in sediment traps than the treatments with M. carcinus. (4) Both organic and inorganic sediments in periphyton samples in control treatment were higher that other treatments. The results showed a trend of Hypostomusa effect on increased leaf litter decomposition. In summary, exotic suckermouth catfish appeared to exert stronger effects on primary production and organic and inorganic sediment accumulation than native bigclaw river shrimp.

External Grants Applied:

Student Number: 3