ABSTRACTS

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Movement and habitat use of California spiny lobsters *Panulirus interruptus* in southern California
Withy-Allen, Kira R. ; Hovel, Kevin A.
San Diego State University, San Diego, CA, 92182
withyall@rohan.sdsu.edu
California spiny lobsters (*Panulirus interruptus*) are the target of intense commercial and recreational fishing in Southern California. The state of California is establishing marine protected areas (MPAs) to help maintain a sustainable lobster fishery and the top-down interactions exhibited by lobsters that enhance biodiversity in kelp forest and other habitats. However, we lack basic information about home range and habitat use of lobsters to determine the appropriate size and location of MPAs. Working within and outside of the La Jolla Ecological Reserve (LJER) near San Diego, we 1) monitored lobster movement using acoustic tracking techniques, 2) tethered lobsters to assess predation risk among different habitat types and time of day, and 3) surveyed lobsters to detect habitat associations during the day and night. Lobsters moved minimal distances overnight, but moved greater distances over a period of six months from April to October 2008. Lobster relative mortality rates were lowest at night and highest in surfgrass habitat during the day. Boulder substrate and *Plocamium pacificum* algae were strong predictors of lobster presence. This research provides novel information on movement behavior and habitat use of spiny lobsters in southern California that will be applied to the conservation of this species.
Grad, Oral

Testing predation and risk trophic cascades in the Galápagos Marine Reserve (GMR)
Witman, Jon D.[1] ; Brandt, Margarita [1]; Dee, Laura E.[2]; and Smith, Franz [3].
[1]Ecology and Evolutionary Biology, Brown University, Providence, RI 02912, [2] Marine Science Institute, UCSB, Santa Barbara, CA 93106, [3] CSIRO – CMAR, PO Box 120 Cleveland, Queensland 4163, Australia
Jon_Witman@brown.edu
Predators have important indirect effects on primary productivity as they intimidate rather than consume their prey, however, these risk Trophic Cascades (TC's) are rarely examined in oceanic food webs. We are testing the hypothesis that urchins are controlled by predation and/or risk by measuring predation on urchins with time-lapse cameras and by documenting spatio-temporal patterns of urchin abundance in and out of areas protected from fishing. Preliminary experiments with tethered pencil urchins (*Eucidaris galapagensis*) indicate that hogfish and triggerfish are major predators, with maximum consumption rates of 100% in 5 hrs, suggesting predation TC's. Experiments revealed little overlap between the nocturnal activity of pencil urchins and their principal fish predators, which are apparently diurnal, suggesting that nocturnal foraging of urchins is an adaptive behavioral response to avoid fish predation during the day, representing a risk TC. Analysis of *Eucidaris* abundance patterns indicates a small, but significant elevation of urchin densities at fished vs. no take sites, consistent with a release of top down control. In summary, both types of TC's are apparently operating in the GMR. An experimental framework is proposed to disentangle their relative contribution along with alternate factors regulating urchin populations.
Fac, Oral

Long-term patch dynamics in the community shaped by bivalves, barnacles, ascidians and red algae: multiple foundation species in the White Sea shallow subtidal.
Yakovis, Eugeniy[1]; Artemieva, Anna[1]; Fokin, Michael[2]; Varfolomeeva, Marina[1,2]; Shunatova, Natalia[1]
[1]St.-Petersburg State University, St.-Petersburg, 199034 Russia; [2]White Sea Biological Station, Zoological Institute RAS, 199034 Russia.
yakovis@rbcmail.ru
While facilitation by multiple foundation species (FS) shapes many terrestrial and marine communities, most studies focus on relatively simple systems structured by a single FS. At our research sites in the White Sea empty shells of a clam *Serripes groenlandicus* are the most frequent hard substrate on muddy sand. Shells are covered by clustered barnacles *Balanus crenatus*. Barnacles, in turn, carry co-dominating solitary ascidians and red algae; these FS host many other sessile species. Since 1998 we performed a field experiment to trace the patch dynamics on initially empty *Serripes* shells. During the first 2 years

primarily barnacles and algae occupied shells with later increase of barnacles' share towards the exclusive domination. Upon barnacle growth, a diverse assemblage of conspecifics, algae, ascidians and many more taxa developed on their surface. Nearly all ascidian and about a half of barnacle recruits were attached to adult barnacles. At the age of 9-10 17% of first generation barnacles died and 30% of ascidian biomass concentrated on their empty shells. This sequence of stages explains the variation in structure of epibenthic patches observed in nature. FS studied act as a facilitation cascade and likely also compete for space on primary substrate and barnacles' surface.
Grad, Oral

Testing interaction effects of temperature and salinity of the Asian green mussel (*Perna viridis*) and the charru mussel (*Mytella charruana*).
Yuan, Wei; Walters, Linda; Hoffman; Eric; Schneider, Kimberly
Biology, UCF Orlando, Florida 32817
In recent years, the number of introduced species has greatly increased in the marine environment, largely due to hull fouling and releases of ballast water. This study examines the temperature and salinity tolerances of two non-native marine mussels, the Asian green mussel (*Perna viridis*) and the charru mussel (*Mytella charruana*). These mussels have been found along coastlines and in estuaries of the southeastern United States. We hypothesized that both introduced species are able to survive in a wide range of environmental conditions and their physiological tolerances will facilitate range expansion. Currently, we completed warm trials for *M. charruana*, where large *M. charruana* can survive well in salinity at or greater than 5 ppt with temperatures less than 33° C, whereas small *M. charruana* had a narrower warm temperature range (20 – 30 °C) and wider salinity range (5 – 40 ppt). As for *P. viridis*, the survival of large *P. viridis* was highest in salinities that is greater than 5 ppt with temperatures at 20 °C or greater. These mussels did not survive at 9 °C or below at any salinity. We are continuing testing interactions and the results can aid in predicting the potential range of expansion for both mussels.
UG, poster

Is the range limit of a northern blue mussel determined by physiological tolerance, or a barrier to larval dispersal?
Yund, Philip O.[1]; McCartney, Michael A.[2]; Tilburg, Charles E.[1]
[1] Marine Science Center, U. New England, Biddeford, ME 04005; [2] Center for Marine Science, U. North Carolina-Wilmington, Wilmington, NC 28409
pyund@une.edu
Barriers to larval dispersal and physiological tolerance are often posed as alterative explanations for the range boundaries of coastal marine invertebrate species. However, water flow discontinuities are generally associated with large changes in salinity, temperature, and other chemical and physical properties. Consequently, the association of a species with a particular water mass is often equally consistent with both explanations. The southern range limit of a northern blue mussel, *Mytilus trossulus,* is strongly associated with the cold waters of the Eastern Maine Coastal Current (EMCC), just south of the Canadian border. We present preliminary satellite drifter data that suggest that the boundary between the EMCC and nearshore waters represents a barrier to larval dispersal on a spatial scale of a few tens of kilometers. In addition, transplant experiments indicate that juvenile physiological tolerance (presumably thermal) may set the southern range limit on slightly larger spatial scale, suggesting that both dispersal barriers and physiological tolerance play a role. Future work will test the physiological tolerance of earlier life history stages and map larval abundance onto physical data from hydrographic surveys.
Fac, Oral

Temporal patterns in macrofaunal diversity relative to benthic landscape structure
Zajac, Roman N.[1], Vozarik, Joseph M.[2]
[1] Department Biology and Environmental Science, University of New Haven, West Haven, CT, 06516, USA; [2]Millstone Environmental Lab. Millstone Power Station, Waterford, CT. 06385
rzajac@newhaven.edu