

BIOLOGY 1B FIELD SECTION RESEARCH SYMPOSIUM FALL 2008

Abstracts

EVALUATING THE IMPACT OF FRENCH BROOM (*GENISTA MONSPESSULANA*) ON INSECT RICHNESS AND DIVERSITY IN CALIFORNIA COAST LIVE OAK (*QUERCUS AGRIFOLIA*) WOODLANDS

Sierra Flynn, Rebecca Hu, Gary Dixon, Stephen Chung, Samantha Stevens

Non-native species can pose serious problems to local flora and fauna when they invade ecosystems in which they have not evolved. French broom (*Genista monspessulana*) is a non-native plant species that has aggressively established itself in numerous parts of California. It is essential to study the real level of impact of French broom on arthropod populations that inhabit the native oak woodlands of the Bay Area so as to develop the best possible management strategies. In order to conduct this experiment, three Coast Live Oak (*Quercus agrifolia*) sites were chosen from the Strawberry Creek/Tilden Park regions of Berkeley, CA. Each site consisted of two paired test plots, one with French broom present and one without (six test plots total). Arthropods were collected once a week for three weeks from the three pit-fall traps placed around the oak tree at each test site. We found the diversity of arthropods at all sites, both those with and without French broom, to be similar among the three site locations during the three-week sampling period. Over the course of three weeks, we also observed a greater density of arthropods at the sites containing French broom than at the sites where it was absent. Although the data we collected did not support our original hypotheses that French broom would reduce the abundance and diversity of arthropods and that the arthropod species found in broom sites would not appear in non-broom site, these findings bear important implications for existing and future models. Further investigation into this topic will be essential in generating a better understanding of the real impact of French broom on arthropod communities, which is the next step in creating stable, scientifically-based management strategies that promote overall ecosystem health.

SPATIAL DISTRIBUTION AND ROAD MORTALITY OF MIGRATING OF MIGRATING NEWTS ON SOUTH PARK DRIVE

Johnny Sanvichith, Jimmy Lam, Alexander Stubbs, Kimberly Chan, and Jie Jun Li

Since 1993, South Park Drive in Tilden Regional Park in Berkeley, California has been closed from November 1st to April 1st annually to protect local newts, *Taricha torosa* and *Taricha granulosa* that migrate during the wet winter months to their breeding pools. This study aimed to determine if the current road closures were successful in reducing salamander mortality and if newt migration should begin before November 1. We surveyed South Park Drive after rain events between October 4th and November 1st, 2008, collected dead newts and recorded position, sex, size, orientation, and species of all live newts encountered. We found that newt migration began around the first rains, and that migrating salamanders were clumped in certain areas along South Park Drive. Therefore, closing the road to coincide with the first significant rainfall would reduce newt mortality. Furthermore, it may be possible to reduce newt mortality by focusing on a few areas with particularly high concentrations of newts.

ANALYZING BENTHIC MACROINVERTEBRATE SPECIES DIVERSITY WITH RESPECT TO NATIVE AND NON-NATIVE RIPARIAN TREE SPECIES

Maggie Changala, Josh Rickert, Tyler Grinberg, Stephanie Panlasigui, and Justin Chen

The diversity and abundance of benthic macroinvertebrates (BMIs) in a stream ecosystem is largely influenced by the plant species found in that ecosystem. In order to test if native species would stimulate BMI diversity in a dietary medium, macroinvertebrate samples along six sites of Strawberry Creek were collected and analyzed for population diversity and density. BMI density and diversity were then correlated with the vegetation density of that area. Regression analyses of percent basal area with BMI taxa richness and with BMI diversity indices indicate less than half of the diversity amongst BMIs is due to the presence of the native species. A correlation between basal area from native tree species and BMI taxa richness was found not to exist.

EFFECTS OF SHIPPING TRAFFIC AND ABIOTIC FACTORS ON CRAB SPECIES ABUNDANCE IN THE SAN FRANCISCO BAY

Grace Chuang, Erin Martin, Orion Mercaitis, Maya Mileck, Jessica Post

Invasive species are a serious threat to intertidal ecosystems around the world. In the San Francisco Bay, half of invasive species are introduced in the ballast water of large ships. To investigate the impact of shipping traffic levels on the abundance of native versus invasive species, the crab populations were sampled at four sites located varying distances from the mouth of the San Francisco Bay, as a proxy of traffic levels. We hypothesized that invasive species would be more abundant in locations that experienced more shipping traffic. We used a random sampling technique of manually catching crabs along transects at the various sites and recorded abiotic factors including salinity and dissolved oxygen. Of the crabs collected, the majority were native and consisted of two species: *Hemigrapsus oregonensis*, the Green Shore Crab, and *Pachygrapsus crassipes*, the Striped Shore Crab. Only one invasive crab, *Carcinus maenas*, the European Green Crab, was collected. The data suggested that abiotic factors may affect the population ratio of *P. crassipes* and *H. oregonensis*, which may in turn influence the habitat's susceptibility to invasion by non-native species.

EFFECTS OF SUNLIGHT, MOISTURE, AND HUMAN DISTURBANCE ON EPIPHYTIC LICHENS IN TILDEN PARK, NORTHERN CALIFORNIA

Irina Degtiar, Jason Espinoza, Caroline Jablonicky, Ya-Ting Liu, Bryson Marks, Lev Stefanovich

As a major contributor to the biodiversity in forest ecosystems, epiphytic lichens are sensitive to variations in sunlight, water, pollution, and disturbance imposed on their habitat. This study focuses on common epiphytic lichens on the coast oak trees in Tilden Regional Park, California to determine whether there was a significant difference in lichen abundance on oak trunks between the three areas with different environmental factors such as moisture, sunlight, and disturbance. We found that the area with a higher moisture level had markedly greater lichen abundance than the drier and disturbed areas. The edge effect from human disturbance is another possible explanation for the reduced lichen abundance in the disturbed area. In addition, the majority of lichen abundance was found on trees with canopy coverage between 50% and 80%. Overall, our results may aid in improving current restoration methods and maintaining lichen biodiversity in natural ecosystems.

NATIVE *POLYSTICHUM MUNITUM* COMPETITION WITH INVASIVE *RUBUS DISCOLOR*

Cherise Stanley, Katharine Guan, Ian Rose, Chase Quam, Eli Strauss

This study explores the effects of the invasive Himalayan Blackberry (*Rubus discolor*) on the native Sword fern (*Polystichum munitum*) in Strawberry Canyon and Tilden Park were studied over three months. The study was conducted through both qualitative and quantitative analysis to determine the *P. munitum* health. After collecting data on frond length, sori count, percent death, and soil pH it was compared to blackberry percent coverage in each plot. No definitive set of factors determine how *R. discolor* will affect *P. munitum*. Correlation was only found in percent death vs. blackberry percent coverage. *R. discolor* may inhibit or deplete nutrients needed for *P. munitum* to maintain health.