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## 2014 Mercer Award

# Dr. Douglas Rasher, A Hoey, & ME Hay

Rasher DB, A Hoey, and ME Hay. 2013. Consumer diversity interacts with prey defenses to drive ecosystem function. *Ecology* 94: 1347-1358.



This award is given for an outstanding ecological research paper published within the past two years by a younger researcher (the lead author of the paper must be 40 years of age or younger at the time of publication). Nominees may be from any country and need not be ESA members.

This paper presents the results of an ambitious, multi-dimensional study with a strong conceptual foundation. It explores the link between species diversity and ecosystem function, providing strong empirical evidence for the key processes and mechanisms underlying complementarities among fish species in promoting the resilience of tropical coral reefs. Tropical reefs worldwide have been losing corals and gaining seaweeds at dramatic rates. Using three sets of spatially paired fished and protected reefs in Fiji, the authors documented that fished reefs were dominated by seaweeds, protected reefs were dominated by corals, and that herbivory by fishes in the protected areas rapidly removed seaweeds typical of the adjacent fished areas. Extensive video monitoring of seaweed outplants detailed which species of fish consumed which species of algae, revealing a striking lack of functional redundancy by the herbivores.

Dr. Rasher used careful field experiments using preferred species coated with the extracts of avoided species to demonstrate that this striking complementarity resulted from herbivores differing in their tolerances to macroalgal defenses. Therefore, *interactions* between algal defenses and herbivore tolerances create an essential role for consumer diversity in the functioning and resilience of coral reefs. This work is also important for management and conservation of coral reefs, because it shows that critical ecosystem processes may deteriorate rapidly when only one, or a few, key consumers are locally extirpated. This beautifully written paper represents an integration of observations and experiments that is both meticulous and innovative, honoring the best traditions in ecology.