

Bioenergetics and Trophic Impacts of Invasive Indo-Pacific Lionfish

KEY WORDS: Lionfish, bioenergetics, trophic impacts

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Bioenergéticas e Impactos Tróficos del Invasor Pez león del Indo-Pacífico

PALABRAS CLAVE: Pez león, bioenergéticas, impactos tróficos

Bioénergétiques et Impacts Trophiques de la Rascasse Volante Envahissante Indopacifique

MOTS CLÉS: Rascasse volante, bioénergétiques, impacts trophiques

EXTENDED ABSTRACT

The lionfish (*Pterois volitans* and *P. miles*) has recently invaded the southeast U.S., Caribbean, and Gulf of Mexico and is threatening native fish communities and coral reefs by altering biodiversity and causing trophic disruption. Lionfish are capable of occupying a vacant niche in overfished reef fish communities; a process that could hamper stock rebuilding efforts for many reef fish fisheries. To assess the impacts of lionfish, we developed a bioenergetics model for lionfish and used to model the potential impact on native reef fish communities. Model parameters were derived by laboratory evaluation of consumption and respiration rates for seawater temperatures from 14 to 32°C for lionfish ranging from 19 to 400 g. The model was calibrated with laboratory growth and consumption data, and performance was analyzed to determine the parameters most sensitive to error. The optimal temperature for lionfish consumption is 29.8°C and based on the environmental conditions and observed growth, daily consumption estimates of the observed 393 lionfish/ha density could remove up to 2.186 kg prey/d during the summer in the Bahamas. This model is a useful tool for examining the influence of temperature on predation rates, exploring the interaction between lionfish and prey communities, and developing predictive values of lionfish trophic impacts throughout the invaded range.



Figure 1. Lionfish in a respirometer