

Feed or fight: Testing the impact of food availability and intraspecific aggression on the functional ecology of an island lizard

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Islands are often considered ideal biological laboratories as they are isolated and vary tremendously in size, structure, and habitats. These factors impose different selective pressures that can drive adaptations of organisms on islands. Our study capitalizes on an island-size gradient in the Greek Archipelago to investigate inter-island divergence in the body size, head shape, and bite force of a lizard, *Podarcis erhardii*.

We hypothesized that strong bites would be an advantage for lizards on small islands. For example, a strong bite might enable that lizard to eat relatively hard or large insects, so if food resources were sparse on a small island the lizard might not starve. A harder bite might also enable the lizard to win fights with the other individuals competing for the same valuable resources like food, mates, or nesting sites on a small island where lizard densities are often high.

We caught lizards on 11 islands in the Greek Cyclades ranging in size from 0.004 to 450 km². We measured the lizards' body and head size, and measured bite force. We then flushed their stomachs to see what they were eating and compared the stomach contents to insects we caught in traps. Finally, we counted the bite scars and lost toes, which typically result from battles with other lizards (see inset picture for an example bite scar).

We found, first, that bite force did increase on small islands. Second, we found that the competition indicators, i.e., bite scars and lost toes, best



Podarcis erhardii from the Greek Islands with tell-tale bite scar on its belly.

predicted the pattern in bite force. Hardness of prey in the diet did not vary significantly between lizards on these different islands. These results shed new light on the drivers of body size and performance differences among island populations.