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Balance control and locomotor adaptations in lizards living in Greek islets

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Microhabitat complexity is likely to be reflected in the challenges imposed on balance control during locomotion and, therefore, in the balance apparatus of the inner ear (vestibular system). Most likely, animals evolved to live in complex habitats (e.g. dense vegetation, rocks) will respond more accurately to perturbations in their locomotion, than animals adapted to living in less demanding habitats (e.g. open, sandy, flat), by possessing a rapidly responding vestibular system and as a result a higher sensitivity. Here, we investigate the maneuverability (and hence balance control) of the Aegean Wall Lizard (*Podarcis erhardii*). Five populations originating from one island population (sandy, open area), were introduced to five Greek islets of the Cyclades, characterized by different habitat complexity. Here, we compare the source population and one of the introduction islands with dense, grassy vegetation. We filmed the individuals running on a complex and on a non-complex racetrack (mimicking the habitat complexity), challenging their maneuverability and, as such, their balance. Our results suggest that head stabilization is crucial for balance during locomotion. We found that lizards from both populations stabilized their head more than their trunk while running, regardless of the type of racetrack, and this stabilization was even higher at higher velocities. If both head and trunk moved continuously during locomotion, keeping balance would be very challenging, because the vestibular system is located inside the skull. Hence, head stability is crucial for animals running in high speeds. Finally, forward velocity was not significantly different between racetracks or populations. This suggests that these lizards possess an intrinsic capacity of performing equally well in complex and non-complex habitats, or that more time is needed to adapt to the new environment.