Wednesday 20/06/18 16:30-16:45

The impressive locomotor performance of *Acanthodactylus boskianus* when negotiating complex terrains

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Natural environments vary enormously in their structural characteristics, from different surfaces (sand, rocks, etc.) and different inclinations (level, uphill, downhill) to different levels of complexity (open, dense vegetation, cliffs, etc.). In this context, obstacle negotiation by running lizards has been well studied from an ecological perspective, but how these animals negotiate the complex terrains, i.e. where the conditions for each foot placement are unique, remains unknown. We examined the effects of running on complex terrains on the kinematics and performance of *Acanthodactylus boskianus,* which are fast running lizards. We quantified three-dimensional kinematics from high-speed videos (325Hz) of seven individuals running on 1) a flat racetrack, 2) a racetrack covered with aligned transverse hemi-cylinders [radius = 0.4 snout-vent lengths (SVL) for our sample], 3) a racetrack covered with the same transverse hemi-cylinders but spaced a distance of 0.8 SVLs with respect to each other, and 4) a racetrack covered with hemi-spheres (radius = 0.4 SVLs). Our preliminary results show that *A. boskianus* do not fall over and are able to keep a fast running gait in the desired direction. Their average running velocity is not affected by the different racetracks suggesting that the lizards have the capacity to keep all forces/moments and inertia in equilibrium in order to proceed steadily despites the perturbations imposed by the terrain. The vestibular system certainly plays an important role in this equilibrium control. Our results corroborate this: we observe a strong head stabilization with the pitching rotation being generally lower than the rolling and yawing rotations. The stabilized head can thus provide the frame of reference needed for accurate segmental movements to deal with terrain complexity.