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Evolution of conspicuous complex colour patterns in lacertids: selection for conspicuousness favours complex contrasting colour patterns

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Many animal conspicuous colourations are involved in signalling processes. Contrasting colour patches often increase the conspicuousness of a colour pattern and enhance signal detection. Recent results suggest that the ventrolateral ultraviolet (UV) patches of *Podarcis muralis* (Laurenti, 1768) convey information about male individual quality. In contrast, the ventral long-wavelength colourations (i.e. orange, yellow and white) are not related with male quality, but may act as amplifiers of UV patches strongly increasing their detectability. As these two types of colourations are frequent among lacertids, we predict that, if the entire conspicuous colour pattern (ventrolateral or lateral UV + ventral long/medium-wavelength) is selected for signalling, these two colourations should covary throughout lacertid evolution. We performed a comparative phylogenetic study involv-



ing 141 species to test whether lateral and ventrolateral colourations (e.g. UV-blue eyespots) are correlated with ventral colourations (e.g. orange, yellow). We used descriptive information about lacertid colourations collected from the literature. However, as colour classifications based on the human visual system are intrinsically biased and may lead to incorrect conclusions, our colour classification was based on a subsample of 43 species for which spectrophotometric data were available. Our results demonstrate that the two conspicuous colourations of lacertids are related throughout their phylogeny (Pagel analysis: difference in log likelihoods = 7.34, $P = 0.01$). These results suggest that selection promotes the evolution of the entire complex pattern rather than the acquisition of a single conspicuous colourations), possibly due to the increased conspicuousness caused by the combination of colours with different spectral properties.

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