

Comparison among three body parts and three software packages to optimise photographic identification of a reptile (tuatara, *Sphenodon punctatus*)

Ricardo de Sá Rocha Mello^{1,*}, Scott Jarvie^{1,2,3}, Lindsay Hazley⁴, Alison Cree¹

Abstract. Individually identifying animals is key to ecological research. Natural marks and patterns of animals that remain stable through time may be used to identify individuals, either manually or with the aid of software. Here we compare the performance of three body parts (chest, right side and right eye) for individual identification of tuatara (*Sphenodon punctatus*) using three software packages (Wild-ID, I³S and StripeSpotter). We also explored pattern stability over time for the chest and right side, and whether the identification rate differed between life-history stages (adults and juveniles) for this long-lived reptile. We used photos of 196 tuatara, including captive and free-roaming individuals. In an initial analysis with a subset of individuals, chest and right side gave better identification rates than the eye when analysed using Wild-ID (the best-performing software). In a further analysis using all photos and Wild-ID, the false rejection rate was lower for chest (0.6%) than right side (2.4%). Although the effect of time on matching scores for chest (up to 3.5 y) and right-side (up to 1.8 y) was significant, it was not large enough to reduce the matching rate; furthermore, no difference in identification rate between adults and juveniles was detected. Overall, chest was the best-performing body part and Wild-ID the best-performing software. Thus, appropriate choice of body pattern for analysis may significantly increase the matching rate, and, as previously shown, software packages vary in performance.

Keywords: body patterns, I³S, non-invasive, Photo-ID, StripeSpotter, Wild-ID.

1 - Department of Zoology, University of Otago, 340 Great King St., Dunedin 9054, New Zealand

2 - Section for Ecoinformatics and Biodiversity, Department of Bioscience, Aarhus

University, 114 Ny Munkegade, 8000 Aarhus C, Denmark

3 - Center for Biodiversity Dynamics in a Changing World (BIOCHANGE), Aarhus

University, 114 Ny Munkegade, 8000 Aarhus C, Denmark

4 - Southland Museum and Art Gallery, 108 Gala St., Invercargill 9840, New Zealand

*Corresponding author; e-mail: ricardosrm@gmail.com

Supplementary material

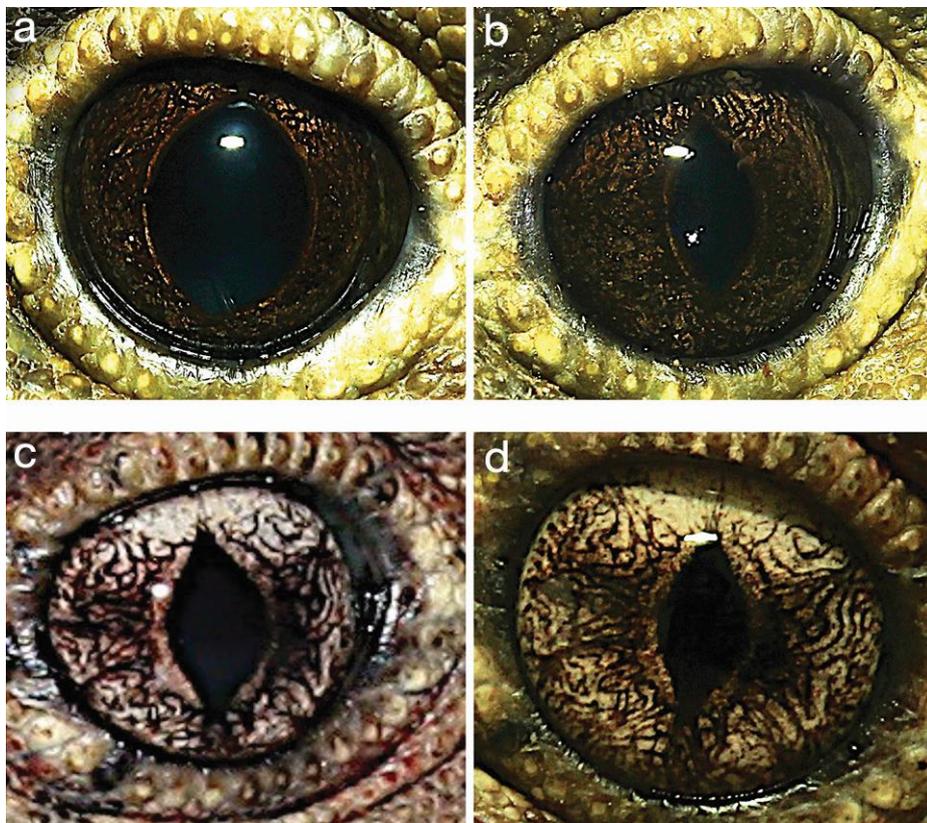


Figure S1. Photographs of the right eye of an adult (a, b) and a juvenile (c, d) tuatara. Both individuals showed pattern stability over a 1-y period. Wild-ID did not detect a match between c and d, but similarities in the iris are evident and false rejection may have been caused by poor/inadequate photo quality.