Effects of the light environment on camouflage against textured surfaces

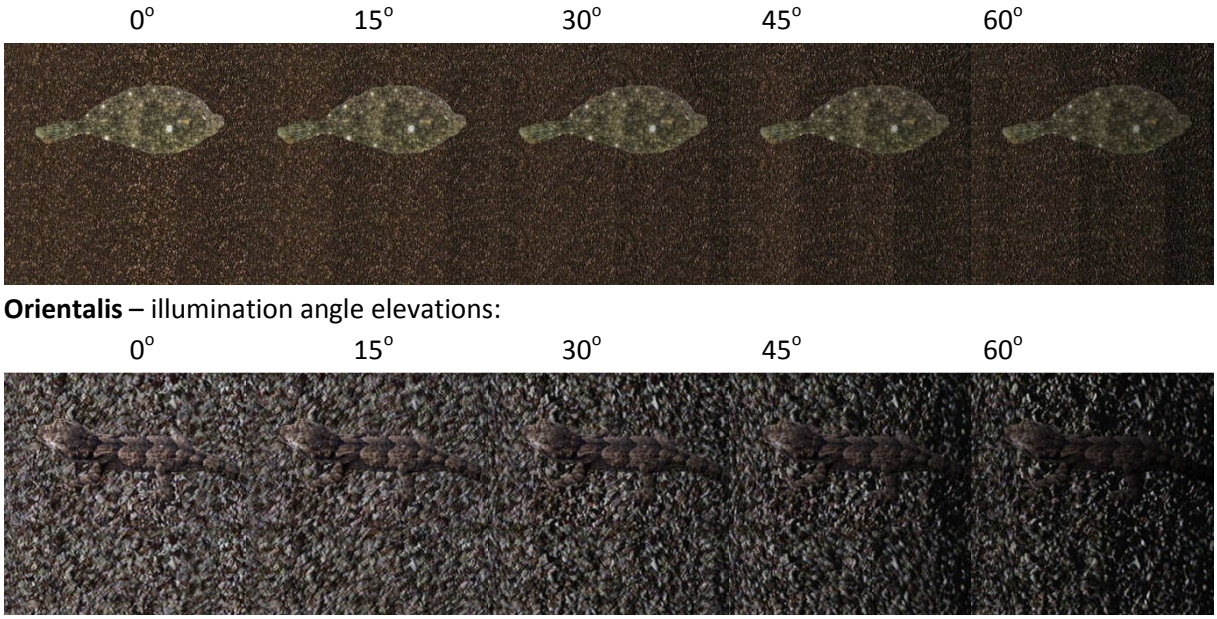
Patrick Green**,** Jiri Filip, Alasdair Clarke, Mike Chantler

Presented to Applied Vision Association (AVA) meeting on Animal Camouflage, Cambridge, September 23rd, 2008.

Abstract

The image of a camouflaged animal on a background surface provides the input to a predator's visual system and is the starting point for neural processing that will determine whether the prey is detected or not. The spatial pattern of luminance in the image arises from variation in both the reflectance and the surface relief of the animal and its background. It is also a function of the illumination of the scene, and will vary with the azimuth and elevation of the light source, and the amount of ambient light present. The effects of these variables of illumination on the image of a camouflaged animal and its background will be important determinants of its visibility to a predator. Graphics techniques such as rendering of surface height maps and bidirectional texture functions provide methods for exploring these effects in either real or synthetic textured target and background surfaces. Some examples are described, and their implications for the effectiveness of different types of camouflage under varying natural illumination conditions are discussed.

Flounder – illumination angle elevations:



Orientalis – illumination angle elevations:

Figure 1: Flouder and orientalis caumoflaged against natural background of variable illumination angle using CURET [1] bidirectional texture samples.

References

[1] K.J. Dana, B. Van-Ginneken, S.K. Nayar, J.J. Koenderink, *Reflectance and Texture of Real World Surfaces*, ACM Transactions on Graphics (TOG), Vol.18, No.1, pp.1-34, Jan, 1999.