Introduction. The conservation process for lepidoptera specimens is extremely challenging, particularly due to their large, fragile wings which become brittle and faded over time, following their natural tendency to decompose. Lepidoptera perceive UV light and some families (Papilionidae, Pieridae, Nymphalidae) bear UV visible markings, created by structural colours and pigments. UV reflectance photography can be used to allow humans to see these markings. Due to the inability of humans to perceive UV light, any photographs generated in the near UV spectrum could be misinterpreted. In this research, digital UV reflectance photography was used to record UV reflective patterns on butterfly wings. Handmade calibration standards developed for forensics were produced, to determine if they could be used to generate quantitative data from UV reflectance photography. This process is called UV optical densitometry. UV reflectance photography was compared with visible light photography, transmitted and reflected visible light microscopy, and scanning electron microscopy to characterise the deterioration of butterfly wing markings.

Experimental. Fresh Hebomoia glaucippe sulphurea specimens, which exhibit UV-reflective markings on the upper wing tip of dorsal surface, were humidified and pinned. A UV-converted Nikon D200 fitted with Baader Ultraviolet Venus filter, and Xenon bulbs with UV blocking removed were used to photograph the specimens. Handmade reflectance standards made of magnesium oxide, plaster and carbon were placed in the frame. Two older specimens were photographed in the same manner. Using reflectance values determined by a Cary 3 UV-Vis Spectrophotometer, each calibration standard was used for optical densitometry in the UV, in other words, to generate quantified measurements of UV reflective wing markings. One fresh specimen and one older specimen were also compared with reflected and transmitted light microscopy, and scanning electron microscopy (SEM).

Conclusions.

- Handmade standards can be used to generate quantitative data from UV reflectance photography.
- Black melanin-pigmented UV absorbent wing markings deteriorate more significantly than erythropterin-pigmented UV reflective wing markings.
- UV reflectance photography complements and supports information gleaned from visible light photography, transmitted and reflected visible light microscopy, and scanning electron microscopy.

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