Abstract

Ultraviolet (UV) means 'beyond violet' (from the Latin – *ultra* – beyond), whereby violet is the colour with highest frequencies in the 'visible' light spectrum. By 'visible' we refer to human vision but it must be taken into account that human visual perception is in comparison to many other organisms rather limited in terms of wavelengths it can perceive. This is why communication in the UV spectrum is often called hidden, although it most likely plays a very important role in the communication of various kinds of information among a wide variety of organisms.

The aim of the present thesis is to elucidate the functions and relative importance of UV patterns mainly in Lepidoptera from a holistic ecological and evolutionary perspective. UV reflectance cannot be studied in isolation: important interactions among several other variables such as light conditions, general optic properties of natural objects, the visual system, and signal processing are thus discussed as well, but an overall emphasis on UV reflectance is maintained throughout. Moreover, this work also briefly touches upon the historical development of UV photography and its methodological background.

The first study traces a significant link between UV reflectance levels and twelve geographical and environmental factors in the distribution of *Pieris napi*, where it turns out that less suitable conditions predict a stronger UV reflectance. Moreover, males and females of this species significantly differ in their levels of UV reflectance. The second study demonstrates that shape variation of UV patterns on the forewings of *Gonepteryx rhamni* correlates with a number of large-scale environmental variables, namely temperature, precipitation, and latitude. The third study analyses the association between 106 taxa of *Colias* and their preferred habitat and area of distribution. Further studies then map UV patterns in genera *Gonepteryx* and *Araschnia* within their spatial distribution.

Variation in the level of UV reflectance and UV pattern shape is significantly linked with large-scale environmental factors within studied species. UV patches may thus play a significant role in intraspecific and/or interspecific communication of butterflies. Furthermore, because it has been demonstrated that UV patterns are an important factor in species identification, it is proposed that they can and should be used as a prospective taxonomical trait. Based on these studies, we can conclude that UV reflectance plays an essential role in the life of lepidopteran species.

Keywords

UV, UV reflectance, Lepidoptera, *Pieris*, *Colias*, Geographic variability, UV photography.