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Discrimination of UV-green patterns in honey bees

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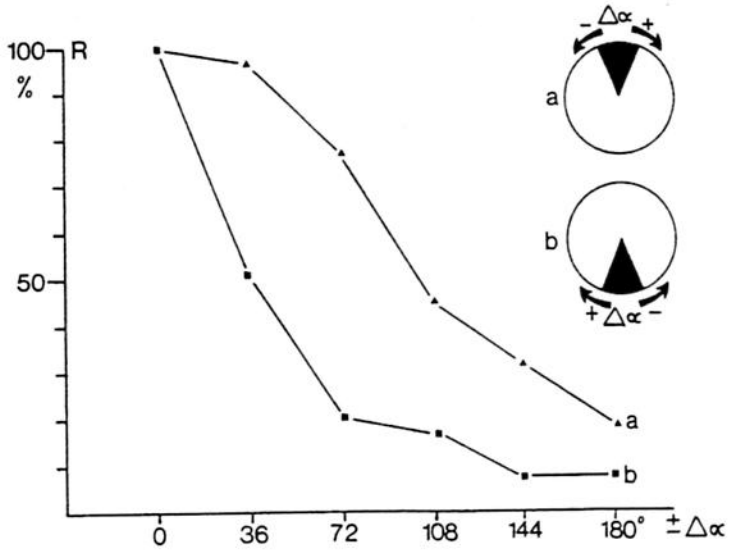
Combined form and color vision is little understood in insects. After Wehner (1972) found evidence for unequal importance of the upper and lower parts of the visual field in the recognition of black and white patterns, we (Menzel and Lieke, 1983) determined a chromatically antagonistic effect in the asymmetry along the dorsal-ventral axis of vertically arranged color patterns. Here we report a series of experiments in which we have further tested the spatially antagonistic effect with a UV-sector (45°) inserted in a disc of green background. The bees were trained to a pattern, in which the UV-sector pointed either upwards or downwards from the centre of the disc. The centre of the disc provided the sucrose reward during training, thus forcing the bees to align to the centre of the disc during their final approach. In the test situation the bee chose between 10 simultaneously presented discs, which differed with respect to the angular position α of the UV-sector. Fig. 1 gives the result for the two series of experiments as discrimination functions $\Delta\alpha$ (abscissa) gives the angular deviation of the UV-sector from the trained position superimposed for clockwise or anticlockwise rotation; R (ordinate) plots the response to the 12 different patterns normalized to the response value of the trained pattern ($\Delta\alpha = 0$) and as average for the same α values. Discrimination is significantly (X^2-test) better for angular deviations of the UV-sector in the lower part of the visual field. This finding supports Wehner's (1972) conclusion about the higher importance of the lower part of the visual field, and our (Menzel and Lieke, 1983) observation that UV reflecting portions of a UV-green pattern are responded to in the same way as the dark portions in a black and white pattern.



Menzel, R., Lieke, E. J. comp. Physiol. 151, 441-448, 1983.

Wehner, R. J. comp. Physiol. 77, 256-277, 1972.