

PROJECT REPORT

Project Title: Functional significance of ultraviolet feeding cues in wild turkeys

Research Agency: United States Department of Agriculture, Animal and Plant Health Inspection Service

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Background:

To better understand how birds can use UV feeding cues, we experimentally investigated the foraging behaviour of avian subjects with UV vision. We used the wild turkey (*Meleagris gallopavo*) to investigate the functional significance of UV feeding cues. Wild turkeys are omnivores who consume a wide variety of vegetation, fruits, seeds, insects and other invertebrates (Hurst 1992). Several lines of evidence support our contention that UV vision is important to turkey natural history. First, domestic turkeys (*M. gallopavo*) are attracted to housing with UV lighting (Moinard & Sherwin 1999). Second, although they lack UV-sensitive opsin photopigments, ocular oil droplets associated with their short-wavelength sensitive cones apparently permit UV vision (Hart et al. 1999). Hart et al. (1999) suggested that domestic turkeys have considerable sensitivity to wavelengths in the UV-A spectral range (315–400 nm). Increment threshold psychophysiological tests have shown that domestic turkey poults are maximally sensitive to the UV spectrum at 380 nm (Barber et al. 2006). Other studies have demonstrated that UV vision is probably of relevance to the social and sexual interactions of turkeys as well. The intensity of the UV reflectance of iridescent feathers from male wild turkeys is condition-dependent (Hill et al. 2005), and the plumage of domestic turkey poults exhibits UV-reflective patterning that is associated with body sites of harmful pecking in commercial poultry houses (Sherwin and Deveraux 1999). Siitari et al. (2002) have shown that another wild species in the order Galliformes, the black grouse (*Tetrao tetrix*), prefers UV-reflecting morphs of a fruit that is a seasonally important component of their diet. Because the implications of UV cues are poorly understood for avian foraging behavior, we comparatively investigated the feeding response of conditioned and unconditioned wild turkeys offered UV-treated food subsequent to postingestive conditioning.

Results:

Hens exhibited no avoidance of untreated food and 75–98% avoidance of food treated with an UV-absorbent, postingestive repellent (0.5–4% anthraquinone; wt/wt) during repellent exposure. Gobblers exhibited 78–99% avoidance of food treated with 0.5–4% anthraquinone. Hens and gobblers exposed to the UV-

absorbent, postingestive repellent subsequently avoided food treated only with an UV-absorbent cue. In contrast, unconditioned (control) hens non-significantly preferred UV-treated food throughout the test of conditioned avoidance. We also observed 1) a weak negative correlation between body condition and internal parasite load and 2) moderate, positive correlations between consumption of UV-treated food and intestinal parasite loads among tested gobblers. Thus, the UV-absorbent cue was used to maintain food avoidance during the four days subsequent to postingestive conditioning. Moreover, the consequences of consuming food treated with the postingestive, UV-absorbent repellent were necessary for conditioned avoidance of the UV-absorbent cue. These findings support the hypothesized function of UV vision for avian foraging behavior, the implications of which remain to be explored for the sensory and behavioral ecology of wild turkeys, and the production and welfare of domestic turkeys.