

What doesn't kill you makes you stronger: detoxification ability as mechanism of honesty in a sexually selected signal

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June 15, 2020

Abstract

Sexual selection maintains colourful signals. The metabolic pathways to produce them often involve toxic byproducts that can reduce survival. However, rather than discarding these otherwise harmful byproducts, animals may use them by integrating them into sexually-selected traits. We tested this using the damselfly *Hetaerina americana*, where males bear a red wing spot evolved by intrasexual competition. We determined that red wing spots are generated by ommochrome pigments derived from the toxic metabolite, 3-hydroxy-kynurenine (3-Hk). We also found that males treated with 3-Hk had more ommochromes than controls but similar survival, suggesting that deposition of ommochromes counteracts the 3-HK toxicity. Thus, we report that sexually selected signals involve the treatment of excreted compounds that could otherwise have lethal effects, a hypothesis we call “detoxifying ability signalling”. Our results provide new insights about the evolution of sexual signals, elucidating a mechanism of honest indicators that could have arisen due to natural selection.

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