Female lizard turns the table: Why exaggerated coloration makes her a good mate

January 27 2011

Most nature lovers know that the more colourful a male fish, reptile, or bird, the more likely it is to attract a female and to have healthy offspring. Females, on the other hand, tend to be drably coloured, perhaps to avoid predators while carrying, incubating, and caring for young.

Curiously, the female striped plateau lizard, which lives in the rocky slopes of Arizona's south-eastern mountains, is an exception to this rule in the animal world. Females are more colourful than males – displaying an orange patch on their throats during reproductive season – and the more colourful the female, the more robust are her offspring. New research published in the British Ecological Society's *Journal of Animal Ecology* has found one reason this may be so.

The colours commonly seen in birds and fish – the orange beak of zebra finches and the luminous colours of tropical fish – are often generated by carotenoids, pigmented nutrients that are obtained through diet. These same carotenoids are also valuable to eggs as they act as antioxidants in the yolks, along with vitamins A and E, protecting the cells and assisting in development of the embryo. So if a female uses her limited dietary intake of carotenoids for ornamentation, it could adversely affect her eggs and offspring.

According to lead author Stacey Weiss, from University of Puget Sound

(Tacoma, Wash., U.S.A.): "In the female striped plateau lizard the orange-coloured patches they develop during the reproductive season are based on pterin pigments, not on carotenoids, so this trade-off between ornaments and eggs may be eliminated."

In fact the research shows that the more colour there is on a female lizard, the more yolk antioxidants there are in her eggs. Ornament colour is also positively related to the yolk antioxidant concentration.

"Thus, in *S. virgatus*, female ornaments may advertise egg quality. In addition these data suggest that more-ornamented females may produce higher-quality offspring, in part because their eggs contain more antioxidants," says Weiss.

Weiss, and collaborators Eileen Kennedy at University of Puget Sound, Rebecca Safran at University of Colorado at Boulder, and Kevin McGraw at Arizona State University, report that the coloration in the female striped plateau lizard probably serves as a sexual signal attractive to males. In evolutionary terms this suggests that more colourful females produce healthier eggs and attract more and/or higher-quality male mates, ultimately producing high-quality offspring.

The research is the first example of a positive relationship between female ornamentation and yolk antioxidants in reptiles. It contributes to an understanding of the evolution of female ornaments and what role they may play. Female ornaments are less common than male ornaments in the animal kingdom, but they do occur, often as a weak expression of the male's typical colour. There has been little empirical examination of this phenomenon until recently. Further research into pterins may explore whether these compounds – as with carotenoids – do extract some cost from the mother or egg.

More information: Stacey L. Weiss et al. (2011), 'Pterin-based

ornamental coloration predicts yolk antioxidant levels in female striped plateau lizards (Sceloporus virgatus)', doi:10.1111/j.1365-2656.2010.01801.x is published in the *Journal of Animal Ecology* on 27 January 2011.

Provided by Wiley