Functional Ecology

BRITISH ECOLOGICAL SOCIETY

Leaving a bad taste in the mouth - worth watching others?

Liisa Hämäläinen, Johanna Mappes, Hannah M. Rowland & Rose Thorogood

Toxic or distasteful prey often advertise their unprofitability with conspicuous 'aposematic' warning signals to deter predators. However, these signals need to be learned, which leaves aposematic prey vulnerable to attack by naïve predators. How, then, can warning signals evolve and be maintained in the prey population? One potential solution to this puzzle is social learning among predators: predation on aposematic prey can be reduced if predators learn about prey defences by observing others. On the other hand, predators might also receive contrasting social information by observing others consuming palatable mimics (undefended species that deceive predators by resembling aposematic prey), which could accelerate predation on both mimics and their defended models. How predators combine multiple information sources when encountering novel prey, however, remains untested.

We used great tits as predators to test whether individuals are more likely to use social information when they have previous experience of prey toxins. Half of the birds experienced a bitter taste before they were provided with social information about novel aposematic prey. We then investigated birds' foraging choices when they encountered novel aposematic and palatable prey (artificial prey with different symbols). We predicted that

Great tit attacking artificial prey (a piece of almond inside a paper packet). Photo: Liisa Hämäläinen

predators would value social information more after they had experienced toxins, but found that socially educated birds consumed fewer aposematic prey, regardless of their previous experience. This suggests that social information might be valuable to all naïve predators. Finally, we investigated whether educated predators were more likely to sample palatable mimics after observing another individual consuming them, but found that all birds were hesitant to attack previously unpalatable prey. In conclusion, our results suggest that social learning among predators can protect novel aposematic prey, regardless of predators' experience with toxins. However, social information about the presence of palatable mimics is unlikely to increase predation on defended models and their mimics when predators have recent personal experience of the model's unpalatability.