Looking different 'helps animals to survive'

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(PhysOrg.com) -- In the animal kingdom, everything is not as it seems. Individuals of the same species can look very different from each other - what biologists term 'polymorphism.'

Sometimes the number of distinct visible forms - 'exuberant polymorphisms' -- in a single animal population can reach double figures. But why?

Scientists at the University of York have developed computer models that may help to explain how this level of variation arises and persists. Their research is reported in the latest issue of *Evolution*.

A prime example of an exuberant polymorphism is the Hawaiian Happy-face Spider, which has been studied by Dr Geoff Oxford and colleagues in the University's Department of Biology. The variations range from a common plain yellow form to rare types sporting red, black or white marks, all of which are inherited.

Dr Oxford said: "It has always been a real mystery why every population of this spider across different Hawaiian islands contains such high levels of variation. This was the starting point for our models."

Previously scientists believed that 'apostatic predation' was the most likely explanation for polymorphisms. This process involves predators developing mental search images of the appearance of the most common prey, so they are more likely to overlook prey of a different appearance. A strange consequence is that looking different from others stops an

individual from standing out. This results in evolutionary selection on the prey to look different from the most common form.

However, the York researchers found that apostatic selection could not explain the sheer number of distinct forms involved in the exuberant polymorphisms of some species, but that 'dietary wariness' could. Dietary wariness is a hesitancy of predators to consume a novel food item and a consequent reluctance to incorporate it into their regular diet. The new research suggests that a modest level of predator dietary wariness can, on its own, lead to the maintenance of large numbers distinct prey forms within a single species.

Dr Daniel Franks, of the University's York Centre for Complex Systems Analysis, said: "A mutant prey individual that looks different from its fellows has a survival advantage because it will be unfamiliar to predators that will be reluctant to change their diet to accommodate it. Some prey species have evolved polymorphisms to deter predators by presenting them with a large number of visually novel foods."

More information: D. W. Franks & G. S. Oxford, 'The Evolution of Exuberant Visible Polymorphisms' is at www3.interscience.wiley.com/journal/122454472/abstract

Source: University of York

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