New idea on how the zebra got its stripes

14 January 2015, by Bob Yirka

A photo showing two Zebras in Mikumi National Park. Credit: Sajjad Sherally Fazel / Wikipedia. (Creative Commons Attribution-Share Alike 3.0 Unported)

(Phys.org) —A small team of researchers affiliated with the University of California has found little evidence to support prior theoretical explanations of why zebras have evolved to have stripes and instead suggest that temperature appears to be a factor. In their paper published in *Royal Society Open Science*, the team describes how they tested other theories and found them wanting and instead found temperature variation to be a predictive factor in striping.

People throughout history have wondered about the black and white stripes displayed by zebras, many asking themselves what caused the evolutionary changes that led to the unique design. Many ideas have been put forth, from suggestions that the stripes ward off flies, to ideas that they somehow confuse lions when they are in a herd. In this new effort, the researchers looked at many of the most prominent ideas and tested them for soundness. They also noted that there is considerable stripe variation among the zebras depending on where they live.

In studying prior theories, the researchers found no evidence that any of them were sound—lions appeared to be unfazed by the stripes, for example, and only some types of biting flies appeared to be put off by the stripes. That led them to wonder if some other factor might be at play that might be revealed by stripe pattern variations between groups. To find out, they noted stripe characteristics on zebras at 16 different locations and compared them with 29 environmental factors such as heat, biting flies, predation, etc. In analyzing the data, the only correlation they could make was stripe pattern and heat—lower temperatures meant fewer or fainter stripes—higher temperatures meant more or darker stripes.

The researchers do not know why temperature might have caused stripes to come about, but suggest it might have something to do with body heat regulation (the difference between the heat absorbing black and reflective white might create air movement) or that stripes evolved in zebras for a variety of reasons related to both heat and as a means of warding parasites or some other unknown problem. They believe more research needs to be done before the riddle can be truly solved.

More information: How the zebra got its stripes: a problem with too many solutions, *Royal Society Open Science*, Published 14 January 2015. DOI: 10.1098/rsos.140452

Abstract

The adaptive significance of zebra stripes has thus far eluded understanding. Many explanations have been suggested, including social cohesion, thermoregulation, predation evasion and avoidance of biting flies. Identifying the associations between phenotypic and environmental factors is essential for testing these hypotheses and substantiating existing experimental evidence. Plains zebra striping pattern varies regionally, from heavy black and white striping over the entire body in some areas to reduced stripe coverage with thinner and lighter stripes in others. We examined how well 29

environmental variables predict the variation in stripe characteristics of plains zebra across their range in Africa. In contrast to recent findings, we found no evidence that striping may have evolved to escape predators or avoid biting flies. Instead, we found that temperature successfully predicts a substantial amount of the stripe pattern variation observed in plains zebra. As this association between striping and temperature may be indicative of multiple biological processes, we suggest that the selective agents driving zebra striping are probably multifarious and complex.