Study reveals shock-absorbing ability of woodpecker beaks
7 May 2014, by Bob Yirka

A male Red-bellied Woodpecker (Melanerpes carolinus). Credit: Ken Thomas/public domain

A team of researchers at Mississippi State University has found that the beaks of woodpeckers are constructed in such a way as to help dissipate energy. In their paper published in Journal of the Royal Society Interface, the team describes their work in analyzing the beaks of several red-bellied woodpeckers and how they found that it has three layers that all help to absorb shocks as the bird pecks away at trees looking for insects inside.

Most everyone knows that woodpeckers bang away at trees (or sometimes other structures) with their beaks to create holes that allow them access to insects hidden inside. Prior research has shown that woodpeckers have a variety of features throughout their heads that help absorb shock, preventing the birds from suffering brain or other damage as they hunt for their prey. In this new effort, the researchers sought to learn if there was anything special about their beaks that might also help soften the internal blow as the birds hammer away at a tree, between one and three hundred times a minute.

Close inspection revealed that the beak's outer or rhamphotheca layer was made of a keratin sheath, which was, like most birds, arranged in a scale pattern, with defined edges between each scale. There was one major difference however, the scale edges, which are not straight but follow a zig-zag course (and have been nick-named sutures because they resemble those used in surgery), were much more wiggly than other pecking birds, such as chickens. This, the researchers noted, would help deflect compressing forces as the beak hit the wood. They found that the scales were also thinner and more elongated than other pecking birds as well, which appears to allow for more sliding of scales over one another during pecking, serving as a shock-absorber.

The researchers also found that the middle "foam" layer of the bird's beak, was more porous than other pecking birds, which would of course allow for directing the energy from impacts into other parts of the birds head that are better able to handle the abuse.

Taken as a whole, it appears a woodpecker's beak offers a first line of defense against head damage when pecking, dissipating energy where possible and directing the rest to where it will do the least

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