Science Magazine Podcast
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Promo
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Music

Interviewer – Sarah Crespi
Finally today, David Grimm, online news editor for *Science*, is here to give us a rundown of some of the recent stories from our daily news site. I'm Sarah Crespi. So Dave, first up we have evolution via roadkill.

Interviewee – David Grimm
Sarah, this is one of those cool stories of actually kind of watching evolution in action. It deals with a group of birds called cliff swallows, and particularly a population that lives in southwestern Nebraska. Now these birds, they make these mud nests on bridges or overpasses for pretty busy roads, so you could imagine that could be a problem for the birds. They fly out of their nest and all of a sudden they are right in the face of oncoming traffic. And a couple that's been studying these birds for 30 years has actually noticed a lot of roadkill – specifically cliff swallow roadkill – on some of these roads under these overpasses.

Interviewer – Sarah Crespi
That's what I liked about this story actually was it's a fortuitous discovery. They said, "Where did all the roadkill go?"

Interviewee – David Grimm
Well right, because what they were seeing over time was they were seeing less and less roadkill. And they said, "Why are fewer of these birds being killed?" The traffic was pretty much the same. The population of the birds was actually larger, so it wasn't actually like the population was going down. But for some reason there was less roadkill than before.

Interviewer – Sarah Crespi
And so after they did the body count, what did they do?

Interviewee – David Grimm
Well, what they did was when they did the body count they actually started looking at the size of the wings of these birds that had been killed. And what they noticed, which was really interesting, was that birds with larger wings were more frequently ending up as roadkill than birds with shorter wings. And over time, the living birds, the wingspan had actually grown shorter over the three decades the researchers had been studying them.

Interviewer – Sarah Crespi
And so they know that there's shorter wingspan as an average over the population, and they know that fewer are dying in car accidents, so how do they relate those two things?

Interviewee – David Grimm
Well, what it turns out is other studies have shown that the shorter a bird's wingspan, the more maneuverable they are in flight, the more able they are to do quick turns, which is something you'd want to do if you're about to get smacked by a car. So their speculation is that the cars are basically acting like natural selection. There is a selection on this population that birds with wings that are too long that are not as maneuverable are more likely to get hit by a car, they're being weeded out of the population, they're not producing offspring, and only the birds with shorter wings that are much more maneuverable are surviving. Over the years, you have this population that keeps getting shorter and shorter wingspans.

Interviewer – Sarah Crespi
Well, this makes me really curious about what other animals are being affected by cars.

Interviewee – David Grimm
Well, right, because, you know, we often think natural selection, we don't think human selection. But this is clearly a case – or seems to be the case – of human-caused selection. There's other factors like this that have impacts on birds – wind turbines, even glass windows, which is one of the leading causes, if not the leading cause, of bird deaths around the world. What impacts are these having on bird populations? And what impacts are other human activities having on other animal populations around the globe? Studies like this may start to reveal that.

Interviewer – Sarah Crespi
And we might get some very, very smart deer down the road. Alright, well next up we have some results from a malaria vaccine trial.

Interviewee – David Grimm
Right, and they're not very good results. This is a vaccine that's called RTS,S. It's not the most user-friendly vaccine name. It's actually an abbreviation of some of the protein components of the vaccine. Now this vaccine was developed in the late 1980s and it's actually the first malaria vaccine that has ever been tested in a Phase III clinical trial. It looked pretty promising at first. In 2011, researchers reported that it cut rates of malaria by half in toddlers. And especially in areas like Africa where malaria is a huge problem, there's lots and lots of deaths every year, something that could cut the rates of malaria in half is a huge deal.

Interviewer – Sarah Crespi
So what's the news here?

Interviewee – David Grimm

Well, the news here isn't as good. It shows that the vaccine is either not working as well as researchers thought, or just not working as long as researchers thought. This new study is sort of a followup from one of the clinical trials that was going on. The researchers were following 450 children in Kenya. And the results revealed that 223 of the kids who received the vaccine, their protection faded over time. It was almost completely gone after four years.

Interviewer – Sarah Crespi
Does this mean that this vaccine is no good, has no use anymore?

Interviewee – David Grimm
Well, not necessarily, it's just not as good as researchers thought. What they say is that because so many children get malaria in the region, and many get it multiple times, they calculated that for every hundred children vaccinated, 65 cases of malaria were prevented. That means that the vaccine is not as good as researchers thought, but it's still doing something. And when you have so many children especially dying, researchers are sort of grasping at straws and they want to use something that works, even if it doesn't work that great. The hope is that they'll use this in the short-term, and in the meantime, researchers may develop a better vaccine or a vaccine that works well in combination with this vaccine that will much improve protection rates.

Interviewer – Sarah Crespi
Great. Alright, well last up, we have a story on a giant and mysterious sea creature.

Interviewee – David Grimm
Right. This is the giant squid. These are deep ocean creatures that can weigh hundreds of kilograms and measure more than 10 meters from their posterior fin to the tips of their two long tentacles. A living giant squid hadn't even been photographed til 2002, so these are very mysterious creatures. This new study is really shedding some light on their genetics. It turns out really remarkably that even though these giant squid live various places around the globe, they all constitute a single species, and they're all very highly related to each other.

Interviewer – Sarah Crespi
So they actually collected samples from all these different squid. What did they do to those samples?

Interviewee – David Grimm
Right. And the samples actually came from some pretty unusual places they found. Some of them were from stranded animals, some of them were captured by trawlers, some were even discovered in the stomach of a sperm whale – which is the only predator giant squids actually face. And what they found was they looked at actually the mitochondria of these animals, and they found almost no genetic differences between individuals. The mitochondrial genome has more than 20,000 base pairs. These are sort of the letters we associate with DNA. And they only saw differences in 181 of these places that were the 43 specimens they looked at.

Interviewer – Sarah Crespi
So you're seeing very few changes in the DNA of the mitochondria. What does that mean about the history of these species?

Interviewee – David Grimm
Well, the researchers aren't really sure what it means. What they say is it means that all the individuals of this species are very highly related. One possibility is that there was this so-called genetic bottleneck that happened. And this is basically when you have a very large population that's shrunk into just a few individuals, and because these few individuals are the only ones that are left that are breeding, over time you have a lot of individuals that are basically related to that founder population of individuals and everybody sort of looks the same, at least genetically.

Interviewer – Sarah Crespi
If they went through a bottleneck, did the scientists have any idea about what caused that?

Interviewee – David Grimm
They don't seem to know what caused the bottleneck. What they speculate is that after this bottleneck occurred, the population exploded again. And that is because the whaling industry knocked out so many sperm whales that the giant squid were able to recover. But what's interesting is that the whaling industry, that's only been happening for a couple centuries, and when the researchers looked at the DNA, they can actually do something called a molecular clock which tells them when some of these genetic changes may have occurred. And they're suggesting that the population expanded 30,000-700,000 years ago, which is way before we were whaling the waters.

Interviewer – Sarah Crespi
Yes, I don't think we had much to do with that.

Interviewee – David Grimm
So it really, you know, a lot of the studies we cover, we sort of answer questions. This study, it really only almost seems to produce questions. You know, why are squids so genetically related? What caused the bottleneck? What's sort of the timing of when all this happened? There's just a lot of new mysteries created by this study.

Interviewer – Sarah Crespi
It sounds like more genetic studies are needed in order to…

Interviewee – David Grimm
Right. And because they only looked at the mitochondrial DNA, the researchers really wanted to look at the entire DNA of these organisms. And that's a project that's currently under way.

Interviewer – Sarah Crespi

Great. So what else is on the site this week, Dave?

Interviewee – David Grimm
Well, Sarah, we've got a story about predicting landslides. Also a story about the next generation of high-tech televisions. These are televisions that are 3D but you don't have to wear the funky glasses. For *Science*Insider, our policy blog, we've got a story about an anthrax vaccine trial that's about to be started in children. Also a story about the future of energy research in the United States. Finally, for *Science*Live, our weekly chat on the hottest topics in science, this week's *Science*Live is about the next plague. Ten years after SARS, what are the new viral threats that are emerging around the globe? Next week's *Science*Live is about conservation strategies. Are they working or are they causing more harm than good? So be sure to check out all of these stories on the site.

Interviewer – Sarah Crespi
Thanks, Dave.

Interviewee – David Grimm
Thanks, Sarah.

Interviewer – Sarah Crespi
David Grimm is the editor for *Science*'s online daily news site. You can check out the latest news, and the policy blog, *Science*Insider, at news.sciencemag.org, where you can also join a live chat, *Science*Live, on the hottest science topics every Thursday at 3 p.m. U.S. Eastern time.