

If They Can Mate, Did They Speciate? A Case Study in Evolution and Meaning of Species

Part 1:Ligers and Chumans and Pizzly Bears! Oh, My!

“Hello dear,” said Mom while cutting the tomatoes for dinner, “How was school?”

Tammy had just arrived home from her after school volunteer work at the animal shelter. “Kinda cool. We had a huge debate in biology today. Hi Dad.”

Dad looked up from his newspaper. “Hi hon.”

“So dear, what did you debate about?” Mom said while concentrating on the tomatoes, “Not the value of genetic altered food again, I hope. I don’t care what they do to plants as long as we can get tasty tomatoes”

“It’s genetically modified organisms, and no it wasn’t that. We were discussing evolution and species and stuff. George, will you lower that!”

Tammy’s brother George was listening to music in the other room.

“Anyway, Mr. Murray was explaining what a species is and how they can’t breed with other species and he was all excited about a news story of how some hunters have found a bear who was a cross between a polar bear and a grizzly and another news story about how human ancestors and chimp ancestors may have interbred not long after they split into two species. Then Mel asked, ‘If there was a pizzly, and a chuman, could there really be a Liger?’”

“That’s from that movie, Napoleon Dynamite. Someone asked the same question last year when I had bio,” said George as he entered the room. “It’s a cross between a lion and a tiger. I’ll bet Murray

was really piz...”

“Don’t open that refrigerator, dear. We’ll be eating in a little while,” said mom. “So, is there such a thing?”

“...off!”

Tammy stared at George, wondering what day George actually stayed awake in bio last year. “Actually, he went on a long lecture about how we shouldn’t think of the chimp and human actually being a chimp and human yet. The human ancestor would have seemed very ape like to us. And apparently the tiger and lion are similar enough that they can mate but since they are only together in zoos I guess it doesn’t count. And no, they aren’t magic.”

“That’s interesting dear. In the supermarket I saw pluquats. I think they are a cross between plums and kumquats.”

“Yeah, well, anyway, then Erica asked if a Chihuahua and a Great Dane could actually, you know, mate. And, if they couldn’t, were they different species? She always asks the best questions.”

Mom responded, “So, what did the teacher say?”

“Well, after the boys all stopped laughing, he explained that they might not be able to do it, umm naturally, but their sperm and eggs are compatible. But, if paleontologists in the future found Chihuahua bones and Great Dane bones they would probably consider them different species.”

“Sounds like the liger dear”

“That’s what I thought. I was going to ask about it at the shelter but Dr. Edwards wasn’t in. Anyway, that got us wondering if the Chihuahua and the Great Dane were different species like the tiger and the lion. Then Erica asked if there were any cases of species in the wild that could mate. Mr. Murray said he read that about 25% of plants and 10% of animals do make hybrids with closely related

species.”

Mom pulled her finger away from the knife suddenly, “Hmm, if scientists could cross a tomato and a navel orange...”

“Yeah, anyway, that’s when Susan said that if they can make hybrids then they are the same species. Sophia thought that the hybrids are sterile, like a mule but Mr. Edwards point out that there was one who just gave birth. Then Tara started chanting ‘If you can mate than you didn’t speciate’. Mr. Edwards made her stop and then said that the whole species concept is kinda murky.”

“Just like you!” muttered George as he left with a tomato slice shoved in his mouth.

“Loser,” said Tammy. “Anyway, Elliot was saying that on his farm his family had a smallish Jack Russell terrier that mated with a medium size Brittany. One of the puppies grew up and mated with the neighbor’s German Shepard. His family was worried because they had always suspected that the Shepard was actually part coyote since it was so vicious and there are coyote in the area. In fact, the terrier’s mom was eaten by a coyote. That’s why they put up that big fence.”

“Hmm, do they grow tomatoes on that farm?”

Part 2: The Sisterhood of the Rings

The next morning, Tammy did her usual Saturday volunteer work at the Animal shelter. She found the vet working on repairing the wing of a Sea Gull.

“Someone found this bird in the mall parking lot, got hit by a car,” Dr. Edwards explained. She had a thriving practice tending to people’s dogs and cats, but liked to help out at the shelter evenings and weekends. The other volunteers loved her energy and knowledge. “It has a broken humerus in this left wing. Even though its humerus is just like that of a dog or cat or us, I doubt I can fix it, bird’s bones are so fragile, but I’ll try. You know how I love birds. He probably won’t fly again. Perhaps we can send it to the zoo. How’s school?”

While handing Dr. Edwards tape and gauze, Tammy told Dr. Edwards about her bio class and thinking about species. “So, if animal A can mate with B and B can mate with C, but A and C can’t mate, who and what is a species? It’s so confusing!”

“You know, Tammy, this gull might be able to help.”

“Dr. Edwards, the gull seems to have too much on its mind to want to discuss the species concept. It’d be like discussing it with my brother. Yuk, and just as messy.”

“Okay, let me explain,” said Dr. Edwards as she readjusted the gull on the table. “Perhaps he’ll stay still long enough to learn something too. This is an American Herring gull. It exists in the northern part of North America, all across the continent. In England and Northern Europe, there is the Herring gull. It’s considered to be a different species or subspecies, but it does sometimes hybridize with the American Herring Gull in Iceland and Greenland. The English version is a lighter grey. In Alaska, the American Herring gull sometimes mates with a gull from far eastern Siberia. It’s called the Vega herring gull. It’s darker than

the American version. In Siberia, as you head west, the Vega gull is replaced by the darker Birula's gull..."

"Let me guess," interrupted Tammy, "They can sometimes hybridize."

"Yup, and the Birula's range borders on the Heuglin's range which borders on the Siberian lesser black backed gull's range. Each one can hybridize and each species is a bit darker than the more eastern one. In Northern Europe and England we find the Lesser black backed gull, which is really dark."

"Wait," Tammy yelled, while wiping bird droppings off her smock. The gull was now safely in a large cage. "You said the plain ole herring gull was there."

"Right, but so is the lesser black backed gull, and, these two won't mate. Seem's the color or something keeps them from mating."

"So, A won't mate with G"

"Exactly! Biologists call this a ring species. They see it as speciation in process. Perhaps the Lesser Black Backed Gull started it, spread east and lightened up as it did. Now some say this isn't a good example because there is some question about whether all the species are evolving from a common ancestor—the American herring gull may have evolved from a different set of gulls and has converged on the herring gull. Some birds can hybridize you know. But you get the idea. Genetically, all these birds are pretty similar. Actually, when I did my Master's degree I studied bird evolution. Another good example is some warblers in Asia. Oh, and there's the famous salamanders in California. Seems that species can interbreed for a while after their speciation. Did you hear about how ancestors of the chimps and ancestors of humans interbred for a while after they split up?"

"Yeah, but that was when the human and chimp ancestors were

barely different. Could they have been ring species?”

“Well, I think the definition of ring species requires a bit more than that, but maybe that’s how they start. Yup, evolution is interesting! And important. I just read a paper about how evolution in heartworm is interfering with medicines. But that’s a discussion for another day. Hope the explanation of the gull ring species cleared some things up. Thanks for the help.” Dr. Edwards left to help a bulldog that had slipped on some ice.

‘Yeah, it helped,’ thought Tammy. ‘But are those gulls A species or G species? And is species singular or plural, anyway?’

Part 3: The Mouse That Caused the Roar

On Sunday, Tammy and her family were having their usual Sunday breakfast at Bauer's Diner. The TV over the counter was tuned to a news channel. As usual, Sandy was working the counter; pouring coffee while loudly commenting on the news stories to the men hunched over their coffees. The news anchor was talking to a person seen in a small monitor in the upper right corner of the screen. Another person could be seen in a monitor in the lower right. Tammy heard a word that caught her attention.

"...species! I mean if they can't prove it is a different species I don't see why it should be on the list," said the person in the upper monitor.

As Tammy listened to the story she teased out some of the details. The Secretary of the Interior wanted to remove the Preble's meadow jumping mouse from the endangered species list. It is found in areas of Colorado and was interfering with construction of housing and retail developments. A biologist hired by the Interior Department had determined Preble's mouse was not that genetically different from another, more plentiful species of jumping mouse. Now, another study was contradicting that finding.

"The department and its scientists are just promoting the President's pro-development agenda! This is not how science should be done," said the person in the lower monitor.

"I don't think that any reasonable person wants to see the whales go extinct, but we are talking about a mouse that may not actually be a species. The Endangered Species Act does not protect hybrids," said the upper speaker.

"This mouse is not a hybrid. The Act protects endangered species and all subspecies of an endangered species. This mouse is either its own species or a subspecies of another..."

“...Mouse species that is not endangered and therefore should not be protected. Look at what has gone on with the Red Wolf!” the man in the upper screen interrupted.

The man in the lower corner looked frustrated, “But, it is different and part of the biodiversity! It may be an endangered species or we may be seeing speciation. It may be evolving...”

Sandy changed the channel with a stab of the clicker. “Who cares!” she said, “It’s just a mouse and don’t give me any of that evolving stuff!” She seemed to be yelling at a guy with a trucker hat who was stirring his coffee and looking at another waitress. “Anyway, it could only be a different species if it was created that way. One species does not become another one! And if you ask me one mouse is the same kind as another! If they can mate then they havta be the same species just the way they were created. Mice don’t change over time.”

“George, will you lower that!” yelled Mom. George put down the pitcher of maple syrup he was holding high over extending tongue.

“I don’t think it should matter if it is its own species,” said Tammy, not sure if anyone in her family was listening. “Species boundaries are kinda real and kinda man made, but it is important that we preserve the gene pool.”

“No, dear, you can’t wear your jeans in the pool.” said Dad as he looked up over the newspaper. “No, I’m talking about why it shouldn’t matter what species it is.”

“Actually, Sis,” said George, with one eye on the blonde girl wearing a shirt that said ‘HERBIVORE’ at the next table. “It would appear that classification and species designation is important if it can be used justify habitat destruction and promote the intelligent design agenda.” George glanced over at the blonde with an arch to his right eyebrow.

Tammy opened her mouth. Dad looked up over the newspaper, and Mom cried ouch as she dropped her knife.

“Check please!” Dad called out. That night Tammy did an internet search on Preble’s meadow jumping mouse.