

CATALINA RATTLER COULD BE OWN SUBSPECIES

By Jerry Roberts

AVALON, CA, 8 JANUARY 2014 - Researchers could announce as early as this winter that the Catalina Island version of the Southern Pacific rattlesnake has enough differences from the mainland version of the serpent to declare it a separate subspecies.

"We're on the verge of perhaps doing that, but just can't at this point," says William K. Hayes, Ph.D., of the Department of Earth and Biological Sciences at Loma Linda University. "We're waiting for Carl Person to finish his dissertation, and he's still doing DNA testing."

Hayes and Person presented their findings so far under the title "Santa Catalina's Overlooked Rattlesnake: Ecology, Venom Composition, Historical Origin, and Unanswered Questions" at the Catalina Island Conservancy symposium last year.

Hayes, Person and colleagues Eric C. K. Gren and Wayne Kelln have noticed that the Catalina rattlesnake is distinguished from the mainland version of Southern Pacific rattler by its tendency to strike without warning. Most rattlers do rattle when disturbed, virtually warning potential victims of a pending assault by fangs. The Catalina version goes right for the chomp.

"Catalina individuals are also less likely to rattle when threatened, but are more inclined to bite when defending themselves," the Loma Linda report states.

The Catalina population lacks neurotoxicity, according to the report, which occurs among some but not all mainland populations. Neurotoxicity is damage to the brain and nervous system from toxic chemicals, which are present in some snake poisons.

The analysis also suggests that the Catalina rattlesnakes came to the Island by chance, across a huge barrier of water probably riding debris. They began from a very small founding population, probably resulting from a 'sweepstakes' dispersal over water, since Catalina has never been connected to the mainland, the scientists say. Unlike the other Channel Islands, which broke from the California coast over many millennia, Catalina rose from the ocean floor.

Further analysis suggests that this isolated Island rattler population represents a relict or surviving population of the "original" Southern Pacific rattlesnake, known to science as *Crotalus oreganus helleri*. Catalina's rattlesnake possibly arrived, according to the report, during the Pliocene Epoch or between 5.3 and 2.5 million years ago.

"Catalina specimens exhibit some morphological differences from the mainland population in blotch pattern and scalation," the report states. The blotches refer to the brownish-black dark markings down the snake's back, separated by lighter-colored bordering. Scalation refers to the arrangement - size, direction, number - of scales on a reptile (or fish). Hayes said that the Catalina snake differs so much physically from the mainland version that these morphological differences on their own are almost enough to declare the Island version a separate subspecies.

Hayes and Person said that many questions remain to be answered about the Catalina population, including:

- Without congeneric competitors, does the Island population experience ecological release, occupying more habitats and taking a broader range of prey than the mainland population?

- Do temperature differences from the mainland result in different periods of activity that influence frequency of encounters with humans? "Does the maritime environment, which is usually cooler and foggier, influence the snake in significant ways?" Hays said.
- Can variation in the venom be linked to preferred prey or prey diversity?

Hays suggested that the "common garden experiment" would be of value - feed the Catalina snakes the same as the mainland Southern Pacific individuals and see what similarities and differences result.

"Our highest priority, however," Hays said, "will be to use this population to study incipient speciation. We can sequence various parts of the nuclear genome, with emphasis on SINES, LINES, and methylation patterns, and compare these with their mainland counterparts."

In genetic research, SINES refers to Short Interspersed Nuclear Element Sequence and LINES are Long Interspersed Nuclear Element Sequences. Both sequences in DNA research help delineate species differences and instances of sameness.

The Southern Pacific rattler, like all rattlesnakes, is in the family of pit vipers or *Crotalinae*. It is Catalina's only venomous snake.

Photos & Captions



Catalina Rattlesnake - The Island's version of the Southern Pacific rattler could be named a distinct subspecies all its own. Conservancy file photo



Coiled Up and Hissin' - The Southern Pacific rattlesnake on Catalina has a tendency to strike before rattling, researchers say. Conservancy file photo