Validity of
Crotalus horridus atricaudatus

version 1

Chad Minter

"Is *Crotalus horridus atricaudatus* a valid subspecies of *Crotalus horridus*?" To answer this question, one must first define a subspecies.

Merriam Webster Dictionary defines subspecies as:

Main Entry: sub·spe·cies

Pronunciation: 's&b-"spE-shEz, -sEz

Function: noun

Etymology: New Latin

: a subdivision of a species: as a : a category in biological classification that ranks immediately below a species and designates a population of a particular geographical region genetically distinguishable from other such populations of the same species and capable of interbreeding successfully with them where its range overlaps theirs b : a named subdivision (as a race or variety) of a taxonomic species c : SUBGROUP 1

- sub·spe·cif·ic /"s&b-spi-'si-fik/ adjective

Criteria

The three criteria for defining a population of animals as a subspecies are:

Is the population of a particular geographic region?

Is the population genetically distinguishable from other such populations?

Is the population capable of interbreeding successfully with them where their ranges overlap? (This serves to establish that they are indeed members of the same species.)

First Test

A geographic range map published by William S. Brown in National Geographic Magazine

clearly shows that the Canebrake Rattlesnake, Crotalus horridus atricaudatus, is indigenous to a particular geographic region. [1]

This differs from "color morphs" in that the two populations have a distinct range. An example of a "color morph" or "variation" would be *Heterodon platyrhinos*. The Eastern Hognose Snake has both solid black and patterned variations which occur over the same geographic range. Another example of "color morphs" or "variations" would be "black phase" and "yellow phase" Timber Rattlesnakes, *Crotalus horridus*, which occur over the same geographic range.

Crotalus horridus atricaudatus clearly passes the first criteria for inclusion as a subspecies.

Second Test

Ginger Clark makes the statement "Northern and southern populations have been recognized as distinct subspecies, but this classification remains controversial. A proposed alternative arrangement recognizes southern, northern, and western morphotypes."[2]

Clark also makes the statement "Analysis of molecular variance demonstrates that traditional subspecific divisions explain only 3.5% of variation, whereas the alternative geographic classification (southern, northern, and western regions) explains 18.6% of genetic variation."[3]

This indicates that *Crotalus horridus* and *Crotalus horridus atricaudatus* are genetically distinguishable from one another.

Crotalus horridus atricaudatus clearly passes the second criteria for inclusion as a subspecies.

Third test

Crotalus horridus and *Crotalus horridus atricaudatus* are capable of interbreeding where their ranges overlap.

Crotalus horridus atricaudatus clearly passes the third criteria for inclusion as a subspecies.

Observation

Clark also makes the statement "Hence, the mtDNA data indicate distinct population segments across the range of *C. horridus* but do not show evolutionary separations that would support subspecific designations."[4]

Since criteria for inclusion as subspecies do not require a certain amount of "evolutionary separations", only that they be genetically distinguishable, this observation is not relevant to subspecific designations.

Practical considerations

Opinions differ concerning taxonomy. Is there a practical reason for considering *C. horridus atricaudatus* valid or invalid? The answer is yes.

The live animal trade offers both Northern and Southern subspecies for sale. When breeders, zoos, and private collectors engage in a commercial transaction involving this species it is important that the buyer and seller are both talking about the same type of animal. Quite simply, a buyer would be very upset to expect to purchase a southern “Canebrake rattlesnake” and end up with a “Timber rattlesnake” or vice versa. Breeding programs that are interested in maintaining true genetics of the subspecies would certainly need to differentiate the subspecies.

This weighs heavily in favor of recognizing *C. horridus atricaudatus* as a valid subspecies.

Conclusion

Crotalus horridus atricaudatus is a population of a particular geographic region, genetically distinguishable from *C. horridus*, and capable of interbreeding with *C. horridus*. *Crotalus horridus atricaudatus* is therefore a valid subspecies.

More scientific data is needed to support the existence or non-existence of a third or fourth subspecies which may or may not include the northwestern and southwestern populations of this species.

A debates forum has been set up at http://www.envenomated.com for feedback to this article.

About the Author

Chad Minter is the Author of Venomous Snakes of the Southeast. Biographical and contact information can be found at http://www.envenomated.com

1.W.S. Brown. "Hidden Life of the Timber Rattlesnake." National Geographic.July (1993):

2.Ginger Clark. "Phylogeography of the Timber Rattlesnake (Crotalus horridus) Based on mtDNA Sequences." Journal of Herpetology 37.1

3.Ginger Clark. "Phylogeography of the Timber Rattlesnake (Crotalus horridus) Based on mtDNA Sequences." Journal of Herpetology 37.1

4.Ginger Clark. "Phylogeography of the Timber Rattlesnake (Crotalus horridus) Based on mtDNA Sequences." Journal of Herpetology 37.1