



Sauromalus ater, Rancho Los Tepetates, Sierra La Libertad, Baja California.



Sauromalus ater, Mountain Springs, San Diego County, California. This population and all of those in the United States were previously assigned to *S. obesus*. Chuckwallas typically inhabit arid regions with moderate low-lying shrub cover and usually are found on or near rocky outcrops with plenty of crevices for use as retreats.



Distribution of Chuckwallas. *Illustration by John Bimms.*

Understanding the Diversity of Chuckwallas (Genus *Sauromalus*) and a Debate Over Names

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All photographs by the author.

Among iguanid lizards, members in the genus *Sauromalus* represent some of the most divergent forms in the family. Among the 45 species in the family Iguanidae, Chuckwallas represent a modest radiation of five currently recognized species (Hollingsworth 2004, Pregill 2004). *Sauromalus ater* is found in the southwestern United States, adjacent regions in México, much of the Baja California peninsula, and on islas Willard, Tiburón, San Marcos, El Coyote, Danzante, San Cosme, Santa Cruz, San Diego, San José, San Francisco, Ballena, Gallo, Partida Sur, and Espiritu Santo in the Gulf of California. The other four species

are restricted to islands in the Gulf of California. *Sauromalus hispidus* occurs on islas Ángel de La Guarda, Granito, Mejía, Pond, San Lorenzo Norte, San Lorenzo Sur, Cabeza de Caballo, La Ventana, Piojo, Flecha, Mitlán, and Smith; *S. varius* on islas San Esteban and Roca Lobos; *S. klauberi* only on Isla Santa Catalina; and *S. slevini* on islas Carmen, Los Coronados, and Monserrate.

Over the past few years, a sometimes heated nomenclatural debate has raged regarding the best way in which to represent the species-level diversity within the genus (Montanucci et al. 2001, McDiarmid et al. 2002; see also *Iguana Times* 9(1–2):18–26,



Sauromalus varius, Isla San Esteban, Sonora. This large species is commonly found in both the arroyo bottoms and on the rocky hillsides.



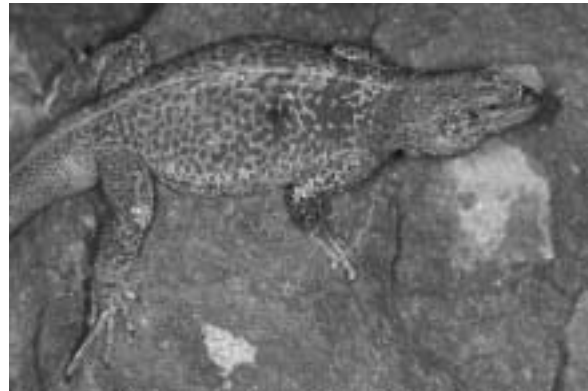
Sauromalus ater, Sierra Vizcaíno, Baja California Sur. This population was previously assigned to *S. australis*.



Sauromalus klauberi, Isla Santa Catalina, Baja California Sur.



Sauromalus varius, Isla San Esteban, Sonora.



Adult male *Sauromalus slevini*, Isla Monserrate, Baja California Sur.



A speckled juvenile *Sauromalus hispidus*, Isla La Ventana, Baja California. Note the faint cross-barring remnant of the juvenile pattern.

which includes the text of the Montanucci et al. petition). The debate has focused on the choice of names for the widespread populations that inhabit the deserts of the southwestern United States, northwestern México, peninsular Baja California, and numerous islands in the Gulf of California. The root cause of this controversy was the synonymy of three species found to intergrade with one another and which lacked diagnosable characters (Hollingsworth 1998). The recent ruling by the International Commission of Zoological Nomenclature (ICZN) brought this specific matter to a close (ICZN 2004; see also p. 10) — but for



Sauromalus ater, Sierra Vizcaíno, Baja California Sur. This population was previously assigned to *S. australis*.

biologists studying these lizards, understanding this nomenclatural debate, the process of nomenclatural decision-making, and the species diversity within *Sauromalus* is important.

As many as ten different species of Chuckwallas have been recognized since Duméril (1856) first described *Sauromalus ater*, but today, only half are considered valid. Evaluating how best to represent biodiversity is the primary motivation of systematic biologists. Since species are regarded as hypotheses to be continually tested, taxonomies inevitably and naturally will change as new information is evaluated. Unfortunately, when systematists modify taxonomies, confusion often develops. Among the users of these taxonomies, the first concern usually centers on the adoption of the new naming system and how to recover information from previously published works that may have used one or more different names. Secondary to these immediate responses is how the new naming system changes previous ideas on diversity, distributional limits, and levels of variance in ecological preferences.

Prior to the synonymy of the three formerly recognized species of Chuckwallas, the name *Sauromalus obesus* was used to describe populations from Arizona, California, Nevada, and Utah. *Sauromalus obesus* also was applied to populations found in western Sonora, northern Baja California, and some islands in the Gulf of California. In the more remote regions of Baja California, the name *S. australis* was used to describe populations inhabiting the southern portion of the peninsula, and the name *S. ater* described populations on islands off its southern peninsular coastline in the Gulf of California. Each of these names had



Adult male *Sauromalus ater*, South Mountain, Maricopa County, Arizona. Some isolated populations of *S. ater* may yet reveal species-level diversity within the genus.



Sauromalus hispidus, Isla San Lorenzo Norte, Baja California. A gravid adult female excavating a burrow.



An adult *Sauromalus hispidus* basking outside a burrow on Isla Ángel de La Guardia, Baja California.



Sauromalus ater, Isla Espíritu Santo, Baja California Sur. This population served as the type locality for many years.



Sauromalus ater, Bahía Kino, Sonora. This population and all of those in mainland Sonora were previously assigned to *S. obesus*.



Adult male *Sauromalus hispidus*, Isla San Lorenzo Sur, Baja California.

been in use since Charles Shaw revised the genus in 1945, and his taxonomy had provided stability for nearly a half century.

The synonymy of *Sauromalus obesus* and *S. australis* with *S. ater* was based on an analysis of additional specimens and previously used diagnostic characters, as well as a search for new characters that could help delimit the species boundaries within the genus (Hollingsworth 1998). With evidence of intergrades and the overlap of diagnostic characters, the species limits between the three could not be determined. Consequently, the familiar name of *S. obesus* was subsumed into *S. ater*, because the former now was considered a junior synonym of the latter.

Decisions regarding the application of zoological names are governed by the ICZN and the rules established in the Code (ICZN 1999). Here, the decision to select *Sauromalus ater* to represent the combined species was based on the Principle of Priority (Article 23). Since *S. ater* was the oldest of the three names, the Principle of Priority gives it precedence over the others. Without the overseeing body of the ICZN and the Code, the authority of researchers who first describe taxa could be undermined at the will of subsequent authors. In extreme cases, a new name could be applied to the same population every year, which would result in taxonomic instability.

Petitions to the ICZN can be submitted when clarification is needed on the validity of names or exceptions to the Code are requested. Montanucci et al. (2001) petitioned the ICZN and requested that the long-used and well-known name, *Sauromalus*

obesus, be given precedence over the little-used and older name, *S. ater*. For two years, the ICZN received and published comments on the petition. One of the greatest concerns was the taxonomic stability of *Sauromalus obesus* and its abundant use in the scientific literature. In opposition to the petition, McDiarmid et al. (2002) commented that the discrepancy in usage between *S. obesus* and *S. ater* reflected the large number of papers published on *S. obesus* in the United States, which could not have been expected to mention *S. ater*. In addition, the name *S. ater* has been used regularly for the last 145 years and should not be regarded as a name infrequently used. In its recent decision (Opinion 2072), the ICZN ruled that the priority of the name *Sauromalus ater* should be maintained (ICZN 2004). In their comments, commissioners stated that publication capacity should not be given precedence over the Principle of Priority and reversing priority does not achieve stability.

During the intervening period, when petitions, comments, and opinions are published, confusion often develops as to which nomenclature to follow. Many invoke a section of the Code (Article 82.1) that requires that the prevailing usage of names be maintained while a case is under consideration. In this instance, authors have chosen to use either *Sauromalus obesus* or *S. ater*. Because different interpretations of prevailing usage can result,



Adult male *Sauromalus hispidus*, Isla San Lorenzo Sur, Baja California.



Sauromalus varius, Isla San Esteban, Sonora.



Chuckwallas from Isla Acatraz, Sonora represent hybrids among two or even three species, all or some of which are probably introduced.

both names have appeared in the literature. Deciding which name best reflected the populations under consideration was subjective, because the petition did not question the synonymy of the three species. However, now that Opinion 2072 has been issued, *Sauromalus ater* should be used.

Before the time of formal taxonomies, the understanding of biodiversity was based on common names. The inherent instability of common names provides insights into the importance of the ICZN and the Code. Stability is relative and our judgment on acceptable levels of change should be gauged against informal versus formal taxonomies. For example, the Indian origin for the name Chuckwalla appears to be derived from as many as four different variants used by tribes in the southwestern United States. Merriam (1979) recorded Chah^{ch} wahl from the Cahuilla, Chah-kwar'-rah from the Southern Paiute, Chuk-war'-rah from the Mono Paiute, and Cha-gwar'-rah from the Kawaiisu. English-speaking peoples most likely adopted the word "Chuckwalla" from one or more of these variations. Other names for Chuckwallas recorded by Merriam (1979) include Hum-sooth' (Kamia), Hum-sool' (Yuma), Um thool'ya (Mohave), Tsah-wahr' (Southern Paiute), Sow-wahr' (Chemehuevi), Sow-war'-rah (Panamint Shoshone), Sah-gwar'-rah (Southern Nevada Shoshone), Sahk-war'-rah (Shivwits), and Chak^{t'}rch (Serrano). Without the use of scientific names and the guidance of the

ICZN rules, names describing the same animals could be as diverse as regional differences in dialects and languages.

Now that this specific nomenclatural debate has come to a close, we can move on to evaluating the consequences of lumping the three species into one. Chuckwalla diversity and their overall biology should be reevaluated in light of our new interpretation of their relationships. The widespread *Sauromalus ater* is found across an extensive range of arid habitats with different plant communities and climatic cycles. Well-known populations should be compared to populations in more remote regions. Many populations are continuously distributed, whereas others are isolated in mountain ranges or on islands. Of the five recognized species of Chuckwallas, four are insular endemics in the Gulf of California. *Sauromalus varius*, *S. hispidus*, *S. slevini*, and *S. klauberi* were each described as a distinct insular species and little controversy has surrounded their recognition (see Grismer 2003 for a review). Since the greatest diversity of Chuckwallas occurs in relatively small, isolated islands or groups of islands, further diversity may be found in isolated populations of *Sauromalus ater*. This wide-ranging species will likely be the source of many more fascinating discoveries.

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OPINION 2072 (Case 3143)

Euphryne obesa Baird, 1858 (currently *Sauromalus obesus* Reptilia, Squamata): proposal to give the specific name precedence over that of *Sauromalus ater* Duméril, 1856 not approved

Abstract. The Commission has ruled that the priority of the name *Sauromalus ater* Duméril, 1856 should be maintained. *Sauromalus ater* is the senior name for the chuckwalla (family IGUANIDAE) from the southwest of North America. A proposal had been made to give precedence to a junior subjective synonym *S. obesus* (Baird, 1858).

Keywords. Nomenclature; taxonomy; Reptilia; Squamata; IGUANIDAE; *Sauromalus ater*; *Sauromalus obesus*; chuckwallas; southwestern North America.

Ruling

- (1) The name *obesa* Baird, 1858 (specific name corrected under Article 34.2 of the Code), as published in the binomen *Euphryne obesus*, is not to be given priority over *Sauromalus ater* Duméril, 1856, as published in the binomen *Sauromalus ater*, whenever the two names are considered to be synonyms. The Principle of Priority is upheld and *S. ater* Duméril, 1856 has priority over *Euphryne obesa* Baird, 1858 whenever the two names are considered to be synonyms.
- (2) The name *Sauromalus* Duméril, 1856 (gender: masculine), type species by monotypy *Sauromalus ater* Duméril, 1856, is hereby placed on the Official List of Generic Names in Zoology.
- (3) The following names are hereby placed on the Official List of Specific Names in Zoology:
 - (a) *ater* Duméril, 1856, as published in the binomen *Sauromalus ater* (specific name of the type species of *Sauromalus* Duméril, 1856);
 - (b) *obesa* Baird, 1858, as published in the binomen *Euphryne obesus*.

History of Case 3143

An application to conserve the specific name of *Euphryne obesa* Baird, 1858 (specific name corrected to agree in gender with the feminine generic name under Article 34.2 of the Code) for the chuckwalla (family IGUANIDAE) from the southwest of North America by giving it precedence over its junior subjective synonym *Sauromalus ater* Duméril, 1856 was received from Richard R. Montanucci (*Clemson University, South Carolina*), Hobart M. Smith and David Chiszar (*University of Colorado*), Kraig Adler (*Cornell University, Ithaca, New York*), David L. Auth (*University of Florida, Gainesville*), Ralph W. Axtell (*Southern Illinois University, Edwardsville*), Ted J. Case

(*University of California at San Diego*), Joseph T. Collins (*The Center for North American Amphibians and Reptiles, Lawrence, Kansas*), Roger Conant (*Albuquerque, New Mexico*), Robert Murphy (*Royal Ontario Museum, Ontario, Canada*), Kenneth Petren (*University of Cincinnati, Ohio*) & Robert C. Stebbins (*Kensington, California*) on 10 September 1999. After correspondence the case was published in BZN 58: 37-40 (March 2001). The title, abstract and keywords of the case were published on the Commission's website. Comments opposing the application were published in BZN 58: 307-308; BZN 59: 45-48 and 205. Comments in support of the application were published in BZN 58: 229; 307-308.

Decision of the Commission

On 1 December 2002 the members of the Commission were invited to vote on the proposals published in BZN 58: 39. At the close of the voting period on 1 March 2003 the votes were as follows: 12 Commissioners voted FOR the proposals, 12 Commissioners (Alonso-Zarazaga, Bouchet, Brothers, Calder, Halliday, Kraus, Lamas, Macpherson, Minelli, Patterson, Rosenberg and van Tol) voted AGAINST, no votes were received from Cogger, Dupuis and Mahnert. Ng was on leave of absence.

Voting against, Alonso-Zarazaga commented that stability is not better achieved by reversing priority. A junior name should not be given precedence because of preference by a particular school, or as a result of the publication capacity by a given set of researchers. Also voting against, Halliday commented that the case rests on two arguments. First, that there is uncertainty surrounding the type locality of *S. ater*. This is irrelevant to the nomenclatural issue. Second, it is argued that *S. obesus* should be preferred because it is used in a greater number of papers than *S. ater*. There is no Article in the Code that invites the use of this argument, nor do the authors invoke any particular Article to support their case. The nearest relevant Article would be 23.9.3, however, both *S. ater* and *S. obesus* have been in continuous use for over 100 years. Therefore, the Principle of Priority should be upheld and the proposals should be rejected.

Original References

The following are the original references to the names placed on Official Lists by the ruling given in the present Opinion:

- ater*, *Sauromalus*, Duméril, 1856, *Archives du Muséum d'Histoire Naturelle, Paris*, 8: 536.
- obesa*, *Euphryne*, Baird, 1858, *Proceedings of the Academy of Natural Sciences of Philadelphia*, 10: 253.
- Sauromalus* Duméril, 1856, *Archives du Muséum d'Histoire Naturelle, Paris*, 8: 536.