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Anolis (Norops) pandoensis Savage and Guyer 1998 Is a Junior Synonym of *Anolis* *kemptoni* Dunn 1940

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ABSTRACT.—The purpose of this paper is to present evidence that suggests *Anolis pandoensis* is a junior synonym of *Anolis kemptoni*. Comparison of morphological characters from paratypical and topotypical material of *Anolis kemptoni* and *Anolis pandoensis* revealed no significant differences between these taxa.

KEYWORDS.—Anole, Costa Rica, lizard, Panama, taxonomy.

Savage and Guyer (1998; henceforth, SG) described *Norops* (= *Anolis*) *pandoensis* from the Sierra de Talamanca in southern Costa Rica near the Panama border (recognition of *Norops* renders *Anolis* paraphyletic. Thus we follow Williams [1989], Cannatella and de Queiroz [1989], Jackman et al. [1999], and Poe [2004] in recognizing a single genus *Anolis*. 'Norops' may be considered a clade name within *Anolis* rather than a generic name). The new species was compared to four fuscoauratid anoles (sensu Williams 1976; Savage and Guyer 1991) of lower Central America in SG's table 1, most notably showing resemblance to *A. kemptoni*. Few specimens of *A. kemptoni* were available at the time of description of *A. pandoensis*. Here we present observations of fresh topotypical material of *A. kemptoni* and of paratypes of *A. pandoensis* and *A. kemptoni* to demonstrate that *A. pandoensis* is conspecific with *A. kemptoni*.

Key differences between *A. pandoensis* and *A. kemptoni* cited by SG include: leg length, scales between supraocular semicircles, enlarged dorsal scales, enlarged postcloacals in males, female dewlap, and dewlap color in males. We discuss these characters in turn.

SG's table 1 reports that the 4th hind toe of *A. pandoensis* reaches the ear when pressed to the body whereas the toe of *A. kemptoni* reaches only to the shoulder. Later, Savage (2002) stated that "tip of fourth toe reaches between shoulder and orbit, usually only to tympanum" in *A. pandoensis*. We observed overlapping variation in this trait between *A. kemptoni* and *A. pandoensis*. Topotypical *A. kemptoni* specimens display both legs that reach the tympanum (e.g., Poe 1475) and the shoulder (e.g., Poe 1477). In addition, *A. pandoensis* paratypes may have legs that reach the shoulder (e.g., LACM 146245) or the tympanum (e.g., LACM 146246).

Number of scales between supraorbital semicircles also is supposed to distinguish *A. pandoensis* and *A. kemptoni*. In SG's table 1 *A. pandoensis* is said to have 1-2 scales ("usually 2") and *A. kemptoni* one scale (Dunn's original description states a separation of 1.5 scales) separating the supraorbital semicircles. Our observations confirm the range of 1-2 scales in *A. pandoensis*, but we observe counts of zero (e.g., MCZ 165220, Poe 1480), one (e.g., Poe 1476, 1498-9), or two (e.g., Poe 1474-5, 1477-9) in *A. kemptoni*, with a mode of 2.

Presence of enlarged dorsal rows also was used to differentiate *A. pandoensis* from *A. kemptoni*. *Anolis kemptoni* was said to possess uniform dorsals whereas *A. pandoensis* was listed with 2-4 enlarged scales. Our observations indicate that this character varies within both species and within individuals of each species. Some enlargement seems to be present along the dorsum but in an interrupted pattern in most specimens. Some paratypes of *A. pandoensis* (e.g., LACM 146250) show 2-4 rows of slightly enlarged middorsal rows in a fairly uniform pattern, as reported by SG. However, other *A. pandoensis* specimens (e.g., LACM

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146244) and most *A. kemptoni* specimens (e.g., MCZ 165219; Poe 1475) show either no enlarged scales, gradual enlargement from 0-6 rows, or intraindividual variation between these states. Most female specimens present the general trend of middorsal scales described by Dunn, "Dorsal scales gradually increasing to middorsal area," though the uniformity and degree of this enlargement varies.

Enlarged postcloacal scales in males were reported by SG to be present in *A. pandoensis* and absent in *A. kemptoni*. Males of both *A. kemptoni* and *A. pandoensis* were found to exhibit varying degrees of enlargement of postcloacals 3-4 rows posterior to the cloaca (e.g., *A. kemptoni* paratype MCZ 50148 and *A. pandoensis* paratype LACM 146250 display distinctly enlarged scales). Postcloacals were not mentioned in Dunn's (1940) description. We note that this character, which is of great systematic value in many *Anolis* clades, appears to be intraspecifically variable in many fuscoauratid anoles (pers. obs.).

Dewlap size and color are important species-level characters in *Anolis*. SG listed female dewlap as 'plain white' in *A. pandoensis* and absent in *A. kemptoni*. Our field observations indicate that female *A. kemptoni* possess a small white dewlap, and we were unable to distinguish female dewlaps of preserved *A. pandoensis* and *A. kemptoni* in size or color. Dewlap color in males was listed by SG as "pink, anterior margin orange" in *A. pandoensis* and "red, orange spot on anterior margin" in *A. kemptoni*. We have examined live *A. kemptoni* and find that the anterior 1/3 of the dewlap is orange and the posterior 2/3 is pink. Jay Savage kindly provided us with a dewlap photo of *A. pandoensis* in life, and these dewlap colors appear identical to those of *A. kemptoni*.

The Type locality of *A. pandoensis* is the Zona Protectora Las Tablas in Puntarenas Province, Costa Rica, which lies along the Costa Rica-Panama border. The *A. kemptoni* Type locality is Finca Lerida, North of Boquete, Panama, which is approximately 50 km east of the Zona Protectora Las Tablas. Additional *A. kemptoni* specimens have been found west of the type locality in El

Volcan (Dunn 1940; pers. obs.). All *A. kemptoni* and *A. pandoensis* specimens have been found along the Cordillera de Talamanca mountain range, which extends through the border that separates Costa Rica and Panama.

We can find no characters that distinguish *A. pandoensis* from *A. kemptoni*. Thus, we conclude that *Anolis (Norops) pandoensis* Savage and Guyer is a junior synonym of *Anolis kemptoni* Cope.

The inclusion of *A. pandoensis* within *A. kemptoni* does not substantially alter the conception of *A. kemptoni* as described by Dunn. Regarding the characters that were supposed to distinguish *A. kemptoni* and *A. pandoensis*; the 4th toe of the hind leg may extend only to the shoulder or as far as the tympanum (Dunn stated that "longest toe does not reach ear"). The supraorbital semi-circles may be separated by 0-2 scales (Dunn listed 1.5). Dunn's description of the middorsal scales as "gradually increasing to middorsal area" appears accurate, and the number of enlarged scales may range from zero to six even within individuals. Postcloacals show varying degrees of enlargement 3-4 rows posterior to the cloaca in males (trait not mentioned by Dunn). The color of the large male dewlap is orange anteriorly and pink or red over the posterior 2/3, which agrees with Dunn's description. The females have a small white dewlap (trait not mentioned by Dunn). Finally, the range of *A. kemptoni* is extended west approximately 50 kilometers, into Costa Rica along the Cordillera de Talamanca mountain range.

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Specimens Examined

MCZ *A. kemptoni*: 46247 Paratype: Boquete, Panama; 50148 Isthmus of Panama, Panama; 165219-20 Chiriqui: between Cerro Punta and Bambito, Panama. **LACM** *A. pandoensis* paratypes: 146243-50 Zona Protectora Las Tablas in Puntarenas Province, Costa Rica. **POE** *A. kemptoni*: 1474-1480 North of Boquete, near entrance to Sendero Los Quetzales (Finca Lerida area), Panama; 1498-1499 5-10 km East of Volcan, Panama.