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Synonymization of *Uromacer Ricardinii* Peracca, 1897 with *Dendrophis aurata* Schlegel, 1837 (Reptilia: Squamata: Colubridae: Dipsadinae), a Rare South American Snake with a Disjunct Distribution

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Abstract. On the basis of direct comparisons of type material, literature data, and a sample of 47 other specimens examined, we synonymize *Uromacer Ricardinii*, described from São Paulo, Brazil, with *Dendrophis aurata*, described from Suriname and never found there again. This taxon now will be known as *Cercophis auratus*. Additionally, we redescribe the species and provide a detailed synonymy/chresonomy. Finally, we briefly discuss its disjunct distribution, as well as current knowledge of its conservation status.

Keywords. Brazil; Nomenclature; Snakes; Suriname.

Resumo. Com base na comparação direta dos holótipos pertinentes, dados de literatura e uma amostra de 47 outros espécimes examinados, sinonimizamos aqui *Uromacer Ricardinii*, descrita de São Paulo, Brasil, com *Dendrophis aurata*, descrita do Suriname e nunca mais ali registrada. O táxon será conhecido como *Cercophis auratus*. Também fornecemos aqui uma redescrição da espécie baseada no material estudado e na literatura, acompanhada de uma sinonímia/cresonomia. Finalmente, apresentamos uma breve discussão sobre a distribuição disjunta da espécie, bem como apontamentos sobre o estado atual do conhecimento sobre sua conservação.

INTRODUCTION

Schlegel (1837a) provided a diagnosis of *Dendrophis aurata* from Suriname, followed by a more complete description (Schlegel, 1837b). Subsequently, only Duméril et al. (1854), Schlegel (1858), and Keiser (1974) used the name in this combination again.

Fitzinger (1843) erected the genus *Cercophis* based on *Dendrophis aurata*. Duméril et al. (1854) mentioned *Dendrophis aurata* but did not know where to place it. Apparently, they were unaware that Fitzinger (1843) had placed it in *Cercophis*, a genus Duméril and Bibron (1844) only mentioned in a list of genera belonging to their “Familia *Dendrophis*”.

Cercophis was not mentioned in some of the most important catalogues covering neotropical reptiles (e.g., Günther, 1858; Boulenger, 1893, 1894, 1896; Werner, 1923, 1925b, 1929; Amaral; 1930a, b, c; Peters and Ore-

jas-Miranda, 1970). Nonetheless, several authors compiling nomenclators (Agassiz, 1844, 1848; Scudder, 1884; Sherborn, 1923, 1924; Schulze et al., 1927; Neave, 1939) listed *Cercophis*, and Sherborn (1932) explicitly used the combination *Cercophis aurata*.

Romer (1956) placed *Cercophis* in the synonymy of *Oxybelis* Wagler, 1830 without giving any arguments supporting his action. Keiser (1974) mentioned that “... Several subsequent workers have mistakenly considered *Dendrophis aurata* Schlegel to be a junior synonym of Bell’s *Dryinus auratus*.” [= *Oxybelis aeneus* (Wagler, 1824), our addition]. Unfortunately, Keiser (1974) provided no references supporting his claim.

Hoogmoed (1983, 1997a) reviewed the history of the name *Dendrophis aurata* Schlegel, 1837 and concluded that it represented a valid taxon that should be named *Cercophis auratus* (Schlegel, 1837) (sensu Fitzinger [1843]). The species exhibited a puzzlingly disjunct distri-

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bution, since it was only reported from the type locality in Suriname and from Porto Real, Rio de Janeiro state, Brazil (see also Vanzolini, 1986).

Peracca (1897) described *Uromacer Ricardinii* [sic] from São Paulo, Brazil. The author characterized the species on the basis of its slender shape, tail nearly as long as the snout–vent length (SVL), and greater number of subcaudals than ventrals. Andersson (1901) described *Leptophis flagellum* from “Rio de Janeiro” and Werner (1909) described *Leptophis vertebralis* from Petrópolis, Rio de Janeiro state. Sixteen years later Werner (1925a) considered his *L. vertebralis* to be identical to *L. flagellum*.

In a footnote, Werner (1929: 104) observed that *Uromacer ricardinii* [sic] might be considered as belonging to a separate genus. One year later, Amaral (1930a) erected the genus *Uromacerina*, with *Uromacer Ricardinii* as the type species. Since then, the taxon has been known generally as *Uromacerina ricardinii* (Peracca, 1897) and used for a slender species of snake from southeastern Brazil (and one locality in eastern Pará; see list of references under *U. ricardinii*, below).

Oliver (1948) suggested that *Leptophis flagellum* might be a synonym of *Thalerophis richardi liocercus* (Wied, 1824) [= *Leptophis ahaetulla liocercus*], but he was not very certain of this. Hoge (1959) mentioned 16 specimens (no voucher numbers or localities provided) of *Uromacerina ricardinii* from the collections of the Instituto Butantan and reported the species from the states of Rio de Janeiro, São Paulo, and Paraná, Brazil. Further, Hoge (1959) synonymized *Leptophis flagellum* and *L. vertebralis* (non Duméril et al., 1854) with *Uromacerina ricardinii*. Peters and Orejas-Miranda (1970) apparently were unaware of Hoge’s (1959) paper as they report *U. ricardinii* from São Paulo only and still, wrongly, consider *L. flagellum* and *L. vertebralis* synonyms of *Leptophis ahaetulla liocercus*.

The record of *Cercophis auratus* from Porto Real, Rio de Janeiro state, by Hoogmoed (1997a, b), as well as the similarities between this species and *Uromacerina ricardinii*, aroused suspicion that both taxa could be synonyms. Information obtained from additional material determined as *Uromacerina ricardinii* (MPEG 6511, 6656, holotype of *Uromacer Ricardinii* MZUT R 1769; for museum acronyms see Sabaj Pérez, 2016) and literature data (Peracca’s [1897] original description and illustrations of *Uromacerina ricardinii* provided by Amaral [1978] and Cunha and Nascimento [1993]) revealed no differences between the two taxa. Finally, a PhD thesis (Bérnils, 2009) and further informal research also corroborated these findings, but formal synonymization was never effected.

Some recent publications treated *Cercophis auratus* and *Uromacerina ricardinii* as different species occurring in Brazil (Rocha et al., 2004; SBH, 2008), which caused confusion in several recent phylogenetic publications and checklists that treated both taxa as valid but of uncertain

relationships (*incertae sedis*; Zaher et al., 2009; Pyron et al., 2013; Costa and Bérnils, 2014, 2015).

In an effort to solve the problem, we performed a detailed investigation of the literature and made direct comparisons between the holotypes of both nominal species and additional material of *Uromacerina ricardinii* from several Brazilian states. As a result, we found no relevant differences between both taxa and concluded that *Uromacer Ricardinii* is a junior synonym of *Dendrophis aurata*.

MATERIALS AND METHODS

We examined 49 specimens in the collections of several Brazilian [FURB (= Universidade Regional de Blumenau), IBSP, MCN, MHNCI, MNRJ, MPEG, MZUSP, ZUFRJ], American (AMNH, MCZ, UMMZ), and European (BMNH, MZUT, NMW, RMNH, SMF, ZMB, ZMH) museums (acronyms used follow Sabaj Pérez, 2016). We collected measurements and meristic data from most of these specimens, including the holotypes of *Dendrophis aurata* and *Uromacer Ricardinii* (Table 1). We had no access to the holotype of *Leptophis flagellum* (NRM 1981). The holotype of *L. vertebralis* (ZMH 4201) is missing and was probably destroyed during World War II (Hallermann, 1998). We measured SVL and tail length with the aid of a flexible iron wire that was straightened and measured along a ruler; other measurements were made with digital calipers to the nearest 0.1 mm. Scale counts and terminology follow Peters (1964). Ventrals were counted following Dowling’s (1951) system. The number of subcaudal pairs was counted, and the terminal scale was indicated as “+ 1”; if that indication is missing, the tail tip was absent (= tail damaged). Mean values are reported as $\bar{X} \pm SD$.

RESULTS

Objective comparisons of the name-bearing types of *Dendrophis aurata* and *Uromacer Ricardinii* and arguments for synonymizing both names

Table 1 presents meristic and morphometric data of our expanded sample of specimens identified as *Uromacerina ricardinii*, including the name-bearing types of this species (= *Uromacer Ricardinii*; MZUT R 1769) and *Cercophis auratus* (= *Dendrophis aurata*; RMNH 813). The dataset shows no significant quantitative differences that would enable the distinction of both taxa. Further, a direct comparison between the holotypes revealed no qualitative differences, despite the practical limitations associated with the states of preservation (Figs. 1–2). Therefore, our data comprise empirical and technical evidence supporting the conclusion that both taxa represent the same entity. Therefore, we herein synonymize *Uromacer*

Table 1. Sex, meristic, and morphometric data for *Cercophis auratus*. Name bearing specimens indicated with asterisk (*). Abbreviations of Brazilian states: MG = Minas Gerais, PA = Pará, PR = Paraná, RJ = Rio de Janeiro, SC = Santa Catarina, SP = São Paulo. Faz. = Fazenda (farm). SVL = Snout-vent length. Where no country is indicated, the material is from Brazil. Material from Amazonia and Suriname have been grouped at the bottom of the table in the last three rows. All other material is from the Atlantic Forest.

Voucher number	Sex	Dorsals	Ventrals	Subcaudals	SVL (mm)	Tail length (mm)	Total length (mm)	Tail/total length (%)	Tail/SVL (%)	Locality
AMNH 71308	F	15-13-11	2 + 136	151/151 + 1	325	281	606	46.37	86.46	SP, São Paulo
AMNH 71309	M	15-13-11	1 + 140	152/153 + 1	365	317	682	46.48	86.85	SP, Boituva
BMNH 1897.4.8	M	15-13-11	1 + 147	161/161 + ?	342	305 + ?				RJ, Porto Real
IBSP 810	M	15-15-11	143		324					SP, São Paulo, Atibaia (Estação Ferroviária Guaxinduva)
IBSP 3266	F	15-15-11	140	155	437	412	849	48.53	94.28	SP, São Paulo, Butantan
IBSP 8020	M	15-15-11	143	179	331	312	643	48.52	94.26	SP, Taubaté (Estação Ferroviária Quiririm)
IBSP 9327	M	15-15-11	141		362					PR, Paranaguá
IBSP 10240	F	15-15-11	145	152	478	384	862	44.55	80.33	SP, Estação Ferroviária Rio dos Campos
IBSP 11191	M	15-15-11	140	158	374	322	696	46.26	86.10	SC, Corupá
IBSP 17371	M	15-15-11	146	169	300	265	565	46.90	88.33	PR, Paranaguá, Praia do Leste
IBSP 22551	F	15-15-11	142	153	465	375	840	44.64	80.65	PR, Pindamonhagaba
IBSP 22957	F	15-15-11	140	157	352	309	661	46.75	87.78	PR, Paranaguá, Praia do Leste, Pontal do Paraná
IBSP 23312	F	15-15-11	145	158	368	322	690	46.67	87.50	PR, Paranaguá
IBSP 24421	M	15-15-11	143	167	358	340	698	48.71	94.97	PR, Antonina
IBSP 26868	M	15-15-11	139	155	351	350	701	49.93	99.72	SP, Parelheiros, Bairro de Santo Amaro
IBSP 34412	F	15-15-11	148	163	435	362	797	45.42	83.22	SP, Jacupiranga, Vale do Ribeiro
IBSP 40625	F	15-15-11	139	166	377	364	741	49.12	96.55	SP, Parque Industrial de Taubaté
IBSP 42061	F	15-15-11	145		404					SP, Peruíbe (Juquiázinho)
IBSP 42971	M	15-15-11	138	161	399	336	735	45.71	84.21	SC, Florianópolis
IBSP 43461	F	15-15-11	150	155	230	150	280	53.57	65.22	SC, Florianópolis
IBSP 45178	M	15-15-11	142	175	317	303	620	48.87	95.58	SP, Cananéia
IBSP 49491	M	15-15-11	139	169	394	367	761	48.23	93.15	SP, Cunha
IBSP 56185	M	15-15-11	139		351					SP, Juquitiba
IBSP 69144	F	15-15-11	145	144	508	397	905	43.87	78.15	SP, São Luís do Paraitinga (Sta Virgínia)
MCZ R 3674	M	15-15-11	1 + 146	169 + 1	ca. 300	270				RJ, Rio de Janeiro
MHNCI 672	F	15-15-11	148	166	403	358	761	47.04	88.83	PR, Morretes, Estrada da Graciosa (PR 410), Mae Catira
MHNCI 2180	F	15-15-11	145	157	365	307	672	45.68	84.11	PR, Pontal do Paraná, Balneário das Canoas
MHNCI 3152	F	15-15-11	138	171	312	265	577	45.93	84.94	SC, Araranguá
MHNCI 4568	M	15-15-11	140	151	277	237	514	46.11	85.56	PR, Pontal do Paraná, Balneário Shangrilá
MHNCI 4888		15-15-11	145	170	125	92	217	42.40	73.60	PR, Pontal do Paraná, Balneário Shangrilá
MHNCI 7778	M	15-15-11	146	150	310	265	575	46.09	85.48	PR, Pontal do Paraná, Balneário de Guarapari
MHNCI 8134	F	15-15-11	149	170	352	335	687	48.76	95.17	PR, Morretes, Serra da Graciosa
MHNCI 9454		15-15-11	150	163	167	131	298	43.96	78.44	PR, Matinhos
MNRJ 1855	F	15-15-11	143	158	375	320	695	46.04	85.33	SC, Joinville
MNRJ 7078	F	15-15-11	143	164	372	344	716	48.04	92.47	MG, Rio Preto
MNRJ 10948	F	15-13-11	146	164	161	119	280	42.50	73.91	RJ, Rio de Janeiro, Serra do Medanha
MZUT R 1769*	? M	15-13-11	2 + 140	158/158 + 1	380	339	719	47.15	89.21	São Paulo
NMW 25186		15-13-11	1 + 144	163/163 + 1	278	245	523	46.85	88.13	no data
RMNH 27672	F	15-15-11	149	129/129 + 1	450	323	773	41.79	71.78	RJ, Porto Real
RMNH 27673	F	15-15-11	146	157/157 + 1	433	353	786	44.91	81.52	RJ, Porto Real
UMMZ 115649		15-15-11	1 + 143	156 + 1	385	320	705	45.39	83.12	RJ, Caxias
UMMZ 204204	? M	15-13-11	2 + 142	155/154 + 1	325	282	607	46.46	86.77	SP, Juquiázinho, Sitio Três Corações
ZMB 66167	M	15-15-11	142	156/156 + 1	381	362	743	48.72	95.01	SC, Blumenau-Corupa (probably)
ZMB 66168	F	15-15-11	2 + 140	150/150 + 1	350	292	642	45.48	83.43	SC, Blumenau-Corupa (probably)
ZMB 66169	M	15-15-11	146	158/158 + 1	299	248	547	45.34	82.94	SC, Blumenau-Corupa (probably),
ZMH R 7736		15-15-11	2 + 140	162/162 + 1	363	332	695	47.77	91.46	Santa Catarina
MPEG 6511	F	15-15-11	136	121/121 + ?	305	225	530	42.45	73.77	PA, Augusto Correa, Faz. Cacoal
MPEG 6656	F	15-15-11	135	149/149 + 1	341	280	621	45.09	82.11	PA, Augusto Correa, Faz. Cacoal
RMNH 813*	M	15-15-11	140	163/163 + 1	279	268	547	48.99	96.06	SURINAME (probably Paramaribo)

Ricardinii with *Dendrophis aurata*. The valid name for this taxon, consequently, is *Cercophis auratus*. We herein present a redescription of *C. auratus*, along with a synonymy/chresonymy in order to clarify nomenclatural relationships among all taxa involved in the problem.

Considering that the name *Dendrophis aurata* (1) has priority over *Uromacer Ricardinii*, *Leptophis flagellum*, and *L. vertebralis* (ICZN, 1999: 24, Art. 23.1) and (2) has been used as valid several times after 1899 (Sherborn, 1932; Keiser, 1974; Hoogmoed, 1983, 1997a, b; Avila-Pires, 2005; SBH, 2008; Bérnils and Costa, 2012; Gasparini, 2012; Costa and Bérnils, 2014, 2015; Wallach et al., 2014; Uetz and Hošek, 2016; Moura et al., 2017; see ICZN, 1999: 28, Art. 23.9.1), the name *D. aurata* (= *Cercophis auratus*) is available and represents the valid name to be applied to populations presently referred to as *Uromacerina ricardinii*.

The name *Dendrophis aurata* (= *C. auratus*) does not answer the conditions stipulated in ICZN, Art. 23.9.1.1 for a *nomen oblitum*, and it thus should be used. Our synonymization represents no threat to nomenclatural stability and clarifies the confusion that arose in the past 36 years concerning these two names.

***Cercophis* Fitzinger, 1843**

Cercophis Fitzinger, 1843: 26 (type species *Dendrophis aurata*); Agassiz, 1844: 8; Duméril and Bibron, 1844: 64; Agassiz, 1848: 212; Scudder, 1884: 59; Sherborn, 1923: 576; 1924: 1183; Schulze et al., 1927: 606; Neave, 1939: 643; Keiser, 1974: 6; Hoogmoed, 1983: 225; Vanzolini, 1986: 5; Hoogmoed, 1997a: 64; Wallach, 1998: 101; Zaher, 1999: 4, 49, 97; Zug et al., 2001: 528; Bérnils, 2009: 222, 224; Vitt and Caldwell, 2009: 572; Zaher et al., 2009: 140; Pyron et al., 2013: 48; Vitt and Caldwell, 2014: 624; Wallach et al., 2014: 156.

Uromacer Duméril, Bibron and Duméril, 1854 (part): Peracca, 1897: 1; Werner, 1929: 104.

Oxybelis Wagler, 1830 (part): Romer, 1956: 580.

Uromacerina Amaral, 1930a: 18 (type species *Uromacer Ricardinii*), 1930b: 85, 1930c: 162; Neave, 1940: 619; Peters and Orejas-Miranda, 1970: 321; Dowling and Duellman, 1974–1978: 112a.2; Wallach, 1998: 227; Zaher, 1999: 4, 38, 39, 44, 75, 97; Zug et al., 2001: 528; Martins et al., 2008: 64; Vitt and Caldwell, 2009: 572; Zaher et al., 2009: 140; Pyron et al., 2013: 48; Vitt and Caldwell, 2014: 624; Wallach et al., 2014: 778.

***Cercophis auratus* (Schlegel, 1837)**

Dendrophis aurata Schlegel 1837a: 157 (holotype RMNH 813, type locality Suriname, leg. H.H. Dieperink); 1837b: 227; Fitzinger, 1843: 26; Duméril et al., 1854: 195; Keiser, 1974: 6.

Cercophis aurata: Fitzinger, 1843: 26; Sherborn, 1932: 297; Hoogmoed, 1997b: 100.

Dendrophis auratus Schlegel, 1858: 46.

Uromacer Ricardinii Peracca, 1897: 1 (holotype MZUT R 1769, type locality São Paulo, Brazil, don. Dr. Ricardini); Andreone and Gavetti, 2007: 61.

Leptophis flagellum Andersson, 1901: 13 (holotype NRM 1981, type locality Rio de Janeiro, Brazil, leg. Dr. Touzet); Werner, 1925a: 56, 1929: 101, 103; Amaral, 1930a: 16; Oliver, 1942: 18.

Leptophis vertebralis Werner, 1909: 221 (holotype ZMH 4201, type locality Petrópolis, Brazil, leg. Dr. Ohaus); Amaral, 1930b: 18; Oliver, 1942: 18; Hallermann, 1998: 214.

Uromacer ricardinii [sic]: Werner, 1929: 104, 105.

Leptophis ahaetulla (Linnaeus, 1758) (part): Amaral, 1930c: 161.

Leptophis occidentalis occidentalis (Günther, 1859) (part): Amaral, 1930c: 162.

Uromacer ricardinii: Amaral, 1930a: 18; Andreone and Gavetti, 2007: 93.

Uromacerina ricardinii: Amaral, 1930a: 18, 1930b: 85, 1930c: 162, 1937a: 109, 1937b: 1748, 1978: 27, 80; Prado, 1945: 33, 72; Hoge, 1959: 79; Peters and Orejas-Miranda, 1970: 321, 1986: 321; Lema, 1973: 64, 1987: 231, 1989: 30, 1994: 87, 2002: 62, 108, fig. 2.68; Vanzolini, 1977: 176; Müller and Ritter, 1978: 44; Freiberg, 1982: 112; Obst et al., 1988: 777; Morato and Bérnils, 1989: 273; Cunha and Nascimento, 1993: 105; Zamprogno, 1997: 211; Morato et al., 1995: 131; Wallach, 1998: 217; Mattison, 1999: 176; Zaher, 1999: 75, 154; Marques, 1998: 54, 56, 83, 87, 94, 95, 97, 98; 2000: 180; Argôlo, 2001: 196, 2002: 451, 2004: 99, 2008: 7; Bérnils et al., 2001: 78; Marques et al., 2001: 161, 170; 2004: 178, 187; Marques et al., 2002: 30, 40; Di-Bernardo et al., 2003: 14; Freitas, 2003: 40, pl. 52; Hutchins et al., 2003: 567; Sawaya, 2003: 136; Vogt and Bernard, 2003: unpaginated table; Rocha et al., 2004: 12; Wrobel, 2004: 509; Freitas and Silva, 2005: 104; Morato, 2005: 58, 60, 71, 76, 105, 109, 110, 113, 118, 119, 139, 142, 174, 181; Tipton, 2005: 279; Hartmann, 2006: 95; Gonçalves et al., 2007: 143, 144, 147, 150; Passamani and Mendes, 2007: 139; Anonymous, 2008: 24; Bérnils et al., 2008: 110, 115, 136; Martins and Molina, 2008: 232; Martins et al., 2008: 61; Pontes et al., 2008: 603, 604, 608; Pontes and Rocha, 2008: 37, 86, 87, 129; SBH, 2008: species number 633; Albernaz and Avila-Pires, 2009: 30; Hartmann et al., 2009a: 346, 351; 2009b: 175, 178; Marques et al., 2009: 144; Pontes et al., 2009a: 330; Pontes et al., 2009b: 798, 799, 800; Vettorazzo, 2009: 19, 22, 32, 55, 90, 95, 99, 102; Zaher et al., 2009: 9; Monzel and Böhme, 2010: 243; Alvares, 2011: 26, 43, 46; Beolens et al., 2011: 220; Freitas,

2011: 118; Hartmann et al., 2011: 38; Zaher et al., 2011: 9; Abegg and Entiauspe, 2012: 125; Bernarde, 2012: 66, 166; Bérnils and Costa, 2012: 21; Hamdan and Lira-da-Silva, 2012: 38, 50; Starace, 2013: 428; Costa and Bérnils, 2014: 83; Wallach et al., 2014: 778; Costa and Bérnils, 2015: 93; Freitas, 2015: 564; Monzel, 2016: 283; Uetz and Hošek, 2016; Castro and Silva-Soares, 2016: 167, 168; Moura et al., 2017: table S1.1, no. 164.

Thalerosophis richardi liocercus (Wied, 1824) (part): Oliver, 1948: 170, 232 (questioned by Oliver himself).

Uromacerina ricardini [sic]: Cunha and Nascimento, 1982: 3; Ananjeva et al., 1988: 336; Coborn, 1991: 197; Cunha and Nascimento, 1993: 169 (fig. 73); Mosmann, 2001: 94, 191; Mattison, 2002: 230; 2007: 253.

Leptophis ahaetulla liocercus (part): Peters and Orejas-Miranda, 1970: 162, 1986: 162.

Cercophis auratus: Hoogmoed, 1983: 225, 226, 236, 251; 1997a: 66; Vanzolini in Peters and Orejas-Miranda, 1986: 5; Abuys, 2003: 271; Claessen, 2003: 23; Hutchins et al., 2003: 558; Rocha et al., 2004: 11; Wrobel, 2004: 94; Avila-Pires, 2005: 35; Tipton, 2005: 89; Mattison, 2007: 233; SBH, 2008: species number 436; Bérnils, 2009: 20, 35, 134, 135, 183, 189, 197, 212, 218, 657, 744, 792, 828; Ghizoni et al., 2009: 138; Bérnils and Costa, 2012: 21; Gasparini, 2012: 61, 91; Starace, 2013: 428; Bérnils et al., 2014: 206; Costa and Bérnils, 2014: 83; Wallach et al., 2014: 156; Costa and Bérnils, 2015: 93; Uetz and Hošek, 2016; Moura et al., 2017: table S1.2, no. 11.

Uromacerina richardii [sic]: Por, 1992: 54, 124.

Uromacerina richardini [sic]: Sajdak, 2010: 70.

Holotype

Adult male (RMNH 813), Suriname, leg. H.H. Dieperink. Type locality restricted to surroundings of Paramaribo, coastal Suriname, as there are no indications (Holthuis, 1959) that Dieperink made extensive travels in Suriname during his stay in Paramaribo as a military apothecary and that his material most likely is from coastal Suriname near Paramaribo and not from the interior of Suriname, which is covered with primary rain forest. However, if it is shown that capture or collection of the holotype occurred after transport by artificial means (see Discussion, below), the type locality is the place from which the name-bearing type or its progenitor began its unnatural journey.

Additional specimens (including holotype of *U. ricardini*)

Forty-eight specimens (18 males, 23 females, 5 of unknown sex, 2 doubtful males); 45 specimens (18 males, 21 females, 4 of unknown sex, 2 doubtful males) from 30



Figure 1. Habitus of *Cercophis auratus* (holotype of *Uromacer Ricardini* Peracca, 1879, MZUT R 1769; SVL 380 mm, tail length 339 mm, total length 547 mm). (A) Dorsal aspect. (B) Ventral aspect. Photos: F. Tillack.

localities in the Atlantic Forest of southeastern Brazil; 2 females from one locality in northern Amazonia, Brazil; and 2 unsexed specimens with no locality data. See Appendix 1.

Diagnosis

See Hoogmoed (1997a).

Redescription of holotype

RMNH 813 is in poor condition; it is flaccid and has lost most of the stratum corneum of its epidermis. A slender, long-tailed snake, tail almost as long as trunk (tail/SVL = 96%; tail/total length = 49%); head almost twice as long as wide (head length 9.3 mm, head width 5.0 mm), slightly depressed (head height 3.4 mm); distinct from

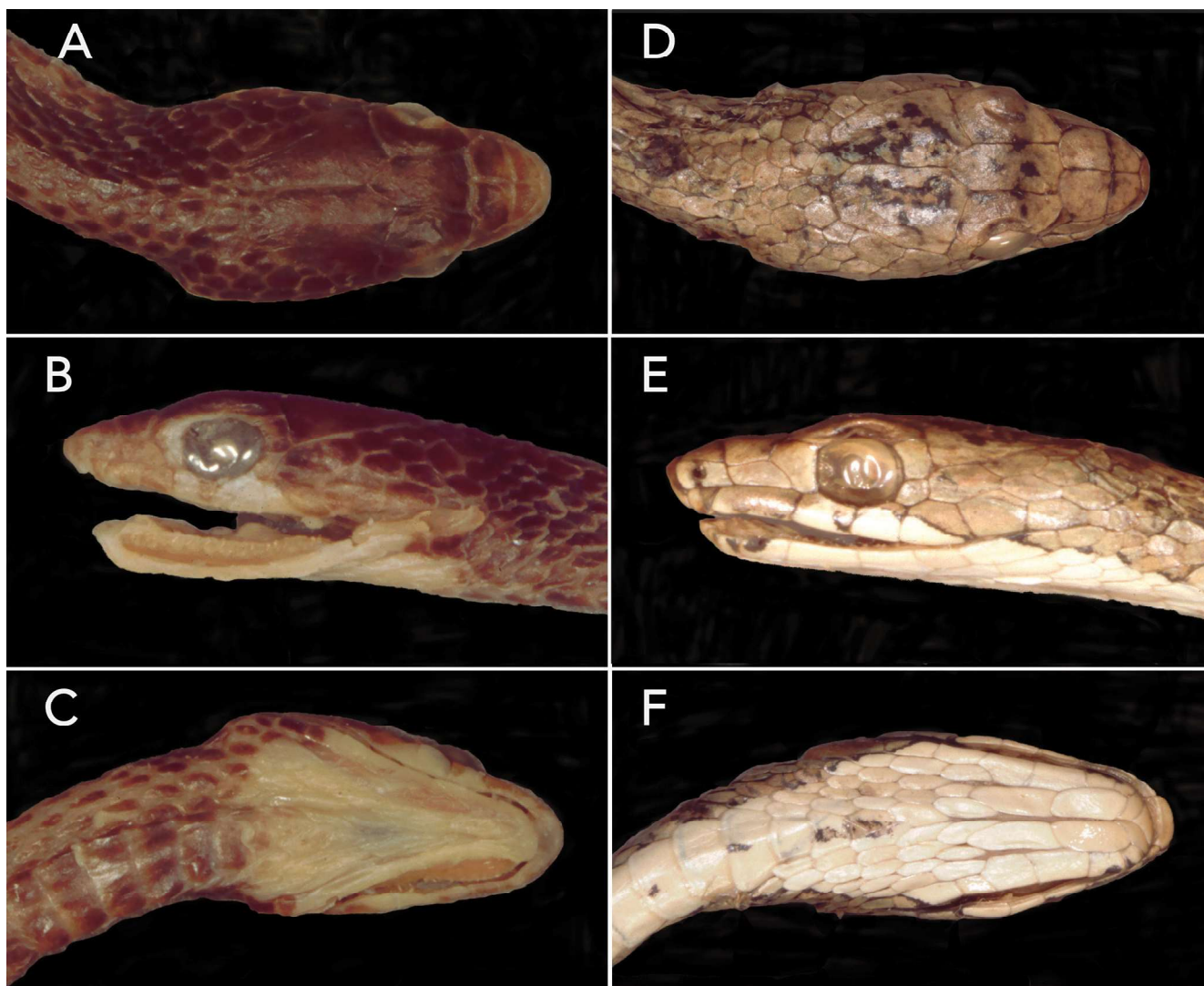


Figure 2. Detailed views of the head of *Cercophis auratus*. Left column: holotype *Dendrophis aurata* Schlegel, 1837, RMNH 813 (head length 9.3 mm). Right column: holotype *Uromacer Ricardinii* Peracca, 1879, MZUT R 1769 (head length 13.3 mm). (A, D) Dorsal aspect. (B, E) Left side. (C, F) Ventral aspect. Photos: F. Tillack.

neck (neck width/head width = 42%); distance eye–nostril 1.7 mm; distance eye–tip of snout (right) 1.9 mm; eyes large (diameter right eye 1.3 mm) with round pupil; supralabials 8 (4, 5); infralabials 10 (5), first pair in contact behind mental, fifth and sixth in contact with posterior chin shield; rostral broader than high, visible from above; nasal undivided, contacting first and second supralabials, nostril nearly centrally placed; one loreal, twice as long as high, contacting second and third supralabials and internasal; one preocular, not contacting frontal; two postoculars, upper larger, both contacting anterior temporal; lower postocular contacting fifth and sixth supralabials; temporals 1 + 2 + 3; right primary temporal obliquely divided; internasals paired, shorter than prefrontals; frontal longer than broad (frontal width/frontal length = 0.58); supraoculars slightly shorter than the frontal; parietals paired, longer than wide (parietals width/parietals

length = 0.62); two pairs of chin shields, anterior pair smaller than posterior pair; posterior chin shields separated from each other only at posterior one-third; dorsal scales smooth, in 15-15-11 rows; 140 ventrals; anal plate divided; subcaudals 163/163 + 1; maxillary teeth 20 + 2, with diastema, posterior two teeth enlarged and not grooved (Figs. 1–3).

Variation

This is a small, elongate snake with body round in cross section, gradually increasing in diameter posteriorly to pencil-thick in adults, widest just anterior of the vent, with a long slender tail about equal in length to the SVL. Percentage tail/total length in males 47% (range 46–50%), in females 46% (range 42–54%); percentage tail/SVL in males 90% (range 83–100%), in females 84%

Synonymization of *Uromacer Ricardinii* Peracca, 1897 with *Dendrophis aurata* Schlegel, 1837

(Reptilia: Squamata: Colubridae: Dipsadinae), a Rare South American Snake with a Disjunct Distribution

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(65–97%). The largest SVL in our sample is 508 mm (female, IB 69144; Table 1). Hartmann (2006) provided a SVL of 522 mm for this same specimen, and Hartmann et al. (2009a) gave a SVL of 937 mm for this specimen, but this is clearly an error of reporting the total length instead of SVL (cf. Hartmann, 2006; Table 1). However, a maximum total length of 100.5 cm and maximum SVL of 59.0 cm were reported for the female type specimen (not examined by us) of *Leptophis flagellum*.

Pictures or drawings of complete specimens were provided by Amaral (1978), Morato and Bérnils (1989), Cunha and Nascimento (1993), Hoge (1959), Hoogmoed (1997a), Marques et al. (2001, 2004), Freitas (2003, 2011, 2015), Freitas and Silva (2005), Pontes and Rocha (2008), Gasparini (2012), and Castro and Silva-Soares (2016).

The head is elongate, slender, flattened, about twice as long as wide, distinctly wider than neck. Snout (distance anterior corner eye to tip of snout) long (about 1.5 times horizontal eye diameter), truncated (in dorsal view), and rounded (in lateral view), projecting over the mouth. Eyes large and domed, causing the frontal-ocular region abruptly rising from the snout in the prefrontal area. Maxillary teeth 18 + 2 (one specimen), 20 + 2 (two specimens), 21 + 2 (seven specimens) or 23 + 2 (three specimens), enlarged posterior teeth separated from the preceding smaller ones by a diastema (Table 1).

Rostral large, wider than high, well visible from above. Nostril round to trapezoid, slightly in front of the center of a horizontally rectangular nasal. Loreal horizontally rectangular, smaller than the nasal, entire or vertically divided in two parts. Preocular large, dorsal part wider than lower part, in broad contact with the supraocular, but not touching the frontal. Two (three in one specimen) postoculars, the upper one larger than the lower one. Temporals usually 1 + 2 (+ 2 or 3), but there are numerous variations due to division and/or fusion of scales. In photos of two live specimens from Espírito Santos (not collected) the postoculars and the first temporal are separated by two small scales in a vertical row (Castro and Silva-Soares, 2016; J.L.R. Gasparini, pers. comm.; see also Fig. 3). The same condition occurs in RMNH 27672 from Porto Real, Rio de Janeiro State (Hoogmoed, 1997a: fig. 5). Supralabials seven (observed once, on left side of type *Uromacer Ricardinii*), eight (most common, 40 specimens) or nine (four specimens on one side, two specimens on both sides). When seven supralabials occur, only the third and fourth are in contact with the eye. When eight supralabials occur, the fourth and fifth are in contact with the eye. When nine supralabials occur, the fifth and sixth are in contact with the eye, but in one specimen the third, fourth, and fifth supralabial and in another the fourth and fifth are in contact with the eye. Eye large, protruding, placed laterally, brille protruding, visible from above and below, with round pupil. Internasals roughly triangular, smaller than the square prefrontals. Frontal

pentagonal, longer than broad, convex from anteriorly to posteriorly, anteriorly widest, with parallel or posteriorly slightly converging sides, narrower than the supraoculars, about as long as its distance to the tip of the snout, sometimes slightly shorter or slightly longer. Parietals larger than frontal, their length about equal to length of frontal + prefrontal, as wide as width of frontal + width of one supraocular.

Mental triangular, separated from the first pair of chin-shields by the first pair of infralabials being in contact. Number of infralabials variable, from 8–11 (8–8 [three specimens], 8–9 [four specimens], 9–9 [eleven specimens], 9–10 [eight specimens], 10–10 [eighteen specimens], 10–11 [five specimens], 11–11 [two specimens]); three, four, or five (mostly four or five) infralabials in contact with the first chin shield. First pair of chin shields shorter than or as long as (42 specimens) the second pair of chin shields, but distinctly wider. Drawings of the head of this species were provided by Peracca (1897), Hoge (1959), Lema (1973, 2002), Cunha and Nascimento (1982), and Hoogmoed (1983, 1997a).

Dorsal scales usually in 15-15-11 oblique rows (41 specimens), rarely 15-13-11 (7 specimens; Table 1). Vertebral scales with truncate posterior tip. Scales in the vertebral row and in the rows bordering the ventrals distinctly wider than lateral scales; “in anterior part of body six lateral rows (rows 2–7) of long and narrow scales; in the middle of the body the paravertebral rows are enlarged as well and there only remain five (rows 2–6) lateral rows of long and very narrow scales, posteriorly more lozenge-shaped. Scales smooth, without pits. No supra-anal ridges. Scales on tail just after the cloaca abruptly different from the scales on the body, rhomboidal, larger, wider and shorter, in four rows only” (Hoogmoed, 1997a). Ventrals 135–150 ($n = 22$; $\bar{X} = 143.38 \pm 2.27$) in females, 138–146 ($n = 19$; $\bar{X} = 142.11 \pm 2.9$) in males (Table 1). Lema (1973) mentioned 152 ventrals in a male. Pontes and Rocha (2008) mentioned a maximum of 198 ventrals, which is inconsistent with our data and requires confirmation. Anal divided. Subcaudals (only taking into account specimens with complete tails with an elongate final scale) in pairs, always more than number of ventrals, 144–171 ($n = 20$; $\bar{X} = 158 \pm 7.29$) in females, 150–179 ($n = 16$; $\bar{X} = 162.06 \pm 8.62$) in males. Drawings of scales on body and tail were provided by Lema (1973, 2002) and Hoogmoed (1997a).

Lema (1973) provided a first, simple description of a partly everted hemipenis. Zaher (1999: fig. 81) provided a detailed description and photographs of the asulcate and sulcate views of the hemipenis.

Color in preservative

Body bronze, brown, grey, or grey-brown, with or without two longitudinal series of irregular, triangular



Figure 3. Portrait of live specimen of *Cercophis auratus* from Espírito Santo, Parque Estadual César Paulo Vinha (not collected). Note the two small scales between the postoculars and temporals. Photo: J.L.R. Gasparini.

black spots alternating on both sides of body and tail; head and dorsum with few black dots. Belly yellowish or milky white with black dots, more or less forming two indistinct longitudinal stripes (Prado, 1945; Hoogmoed, 1997a; Pontes and Rocha, 2008). A black postcloacal spot, narrow in the middle, and wide laterally, on the ventral surface of the tail immediately posterior of the vent (Hoogmoed, 1997a). A dark transverse band on supraoculars and frontal, a light transverse band on the pre-supraocular region between the preoculars (Hoogmoed, 1997a). Upper labials with light and dark spots, a larger white area below the eye with a dark, inverted triangular spot at the border of fourth and fifth supralabial, the tip reaching the border of the mouth. Infralabial area yellow, postmental area white (Pontes and Rocha, 2008). Tongue white anteriorly, brown posteriorly (Pontes and Rocha, 2008). Upper third of the eye light, lower two-thirds dark golden brown (Hoogmoed, 1997a).

Color in life

The color generally is described as being cryptic (Prado, 1945; Pontes and Rocha, 2008), which makes the species difficult to see in nature, looking like a dry branch (Prado, 1945).

Distribution

The species is widespread along the Brazilian coast, from northern Rio Grande do Sul to southern Bahia (where it occurs at higher elevations and further inland than in the southern portion of its distribution; see Argôlo, 2001, 2002, 2004) and, separated by a large disjunction, occurs at one locality further north in the Amazonian biome in eastern Pará (Cunha and Nascimento, 1982, 1993) and in Suriname. North of Rio de Janeiro data are scarce and localities are widely separated (Fig. 4). Localities of our samples are available in Table 1 and Appendices 1 and 2.

Distribution maps (point localities) were provided in unpublished theses by Bérnils (2009) and Alvares (2011). Freitas (2015) published a rough and incomplete distribution map.

Natural history

Cercophis auratus is a mostly arboreal species that also has been observed on the ground. In SE Brazil it is apparently restricted to coastal environments between sea level and 1,050 m above sea level in São Paulo (Bérnils, 2009). In Pará and Suriname the species also occurs in coastal areas at sea level. It has been reported from Restinga, primary ombrofilous and secondary forest, and forest edges.

Vettorazzo (2009) considered *Cercophis auratus* a rather exigent (factor 28 on a scale of 32) species that is only encountered in areas with well-preserved habitat, like large preserves of primary forest or old secondary forest (but see Müller and Ritter [1978] and Castro and Silva-Soares [2016]).

Diet seems to consist mainly of frogs. Amaral (1978), copied by Por (1992), reported this species to be a lizard specialist. Morato and Bérnils (1989) offered a variety of food items (juvenile lizards, beetle larvae, crickets, and ants) to recently hatched juveniles, but they refused to accept any of them. Marques (2000) reported strictly frogs as food items found in preserved specimens. Hartmann et al. (2009a) assumed that *Cercophis auratus* captures anurans, mainly hylids, on the vegetation in their resting place; the authors offered recently metamorphosed tree frogs to recently hatched *C. auratus* that promptly accepted the prey. The same specimens showed interest in juvenile *Hemidactylus mabouia* (Moreau de Jonnés, 1818) but could not capture them. Pontes and Rocha (2008) reported hylids (and one lizard in captivity) as prey.

Clutch size seems to be small, though variable (three eggs, according to Morato and Bérnils [1989]; five eggs, according to Hartmann [2006]). Both documented clutches were laid in November and the eggs hatched between 66 and 87 days later.

Common Brazilian names

“Bicuda”, “cipó-liquenosa”, “cobra-cipó”, “cobra-líquen”, “cobra-sipó-metálica”.

DISCUSSION

We directly compared the holotypes of *Dendrophis aurata* and *Uromacer Ricardinii* (Fig. 2) and compared their data with those of recently collected material (Table 1). Based on these data, we determined that *U. ricardinii* is a junior synonym of *D. aurata* and that all specimens stud-

ied by us belonged to a single taxon that should bear the name *Cercophis auratus*. Some questions with respect to distribution and conservation still remain open to investigation and debate.

Information on the distribution of *Cercophis auratus* has been scarce and only increased significantly in the past 40 years. Until the 1970's, *Uromacerina ricardinii* (= *C. auratus*) was generally considered to be known only from São Paulo (Peters and Orejas-Miranda, 1970), although Hoge (1959) had already indicated several other states where the species occurred. Since then, it has been reported from Rio Grande do Sul (Lema, 1973, 2002), Santa Catarina (Amaral, 1978; Müller and Ritter, 1978), Pará (Cunha and Nascimento, 1982, 1993), Paraná (Marques, 1998), Espírito Santo (Zamprogno, 1997; Gasparini, 2012; Castro and Silva-Soares, 2016), Bahia (Argôlo, 2001, 2002, 2004), and Rio de Janeiro (Pontes, 2006; Pontes et al., 2009a, b; Pontes and Rocha, 2008). Amaral (1978: 80), in the legend to plate 36, attributed the species only to "São Paulo", although in the index of the same work (p. 90) it is explicitly stated that the drawing referred to "I.B. 9631

[from] Perdizes, Sta Catarina" (= IBSP 9631). The same author considered the species to be rare, in contrast to a previous study in which he claimed it was well represented in the collections of the Instituto Butantan (Amaral, 1930a). Freitas and Silva (2005) incorrectly considered the occurrence in Bahia as the northernmost distributional limit of this species in Brazil, ignoring the record from eastern Pará by Cunha and Nascimento (1982, 1993).

In Suriname, *Cercophis auratus* has never been found again after H.H. Dieperink collected the holotype of *Dendrophis aurata* in the 1820's (Hoogmoed, 1997a, b). It neither has been reported from a nearby well-sampled area such as French Guiana (Chippaux, 1986; Starace, 1998, 2013) or northern Pará (Avila-Pires et al., 2010), rendering its presence in Suriname enigmatic. It is unlikely that the type locality is in error because Dieperink (who sent material from Suriname to the Rijksmuseum van Natuurlijke Historie in Leiden [RMNH; presently known as Naturalis Biodiversity Center] between 1824 and 1842) only worked in Suriname, and there are no indications of doubtful data regarding the localities of his specimens (Gijzen, 1938: 49, 97, 103–105, 307; Holthuis, 1959: 21–23; Hoogmoed, 1983: 224–225).

The peculiar disjunct distribution of populations along the Atlantic coast of SE Brazil and those of Amazonia could be explained in several ways. (1) Suriname specimens could represent an independent and isolated population, the status of which remains unclear pending further investigations based on additional material. (2) Alternatively, as a more plausible scenario, one could expect that all Amazonian specimens (reported from Suriname and Pará, sensu Cunha and Nascimento [1982, 1993] and Hoogmoed 1997a, b)) would represent a more widespread population present in northern South America. In that case, one should also expect the presence of *Cercophis auratus* in areas where it remains unreported, such as French Guiana, other localities in the state of Pará, and in the state of Amapá, Brazil. Again, only additional material can throw light on the problem. (3) One could assume as well that the disjunct populations are an artefact of low collecting effort and that the species has one large and continuous distribution area from the Guianas along the coast to SE Brazil. (4) The scattered Amazonian records could also be explained by unintentional introduction with agricultural products or other material imported from southern Brazil. Although such an assumption may sound feasible, there are no known instances of any other such introductions.

Almost all publications reporting field data on this species mention that specimens are only encountered rarely, even in long-term studies with considerable collecting effort (Lema, 1973; Cunha and Nascimento, 1982, 1993; Argôlo, 2001, 2002; Morato, 2005; Hartmann, 2006; Hartmann et al., 2009a, b; Gonçalves et al., 2007; Pontes and Rocha, 2008; Pontes et al., 2008, 2009a, b;

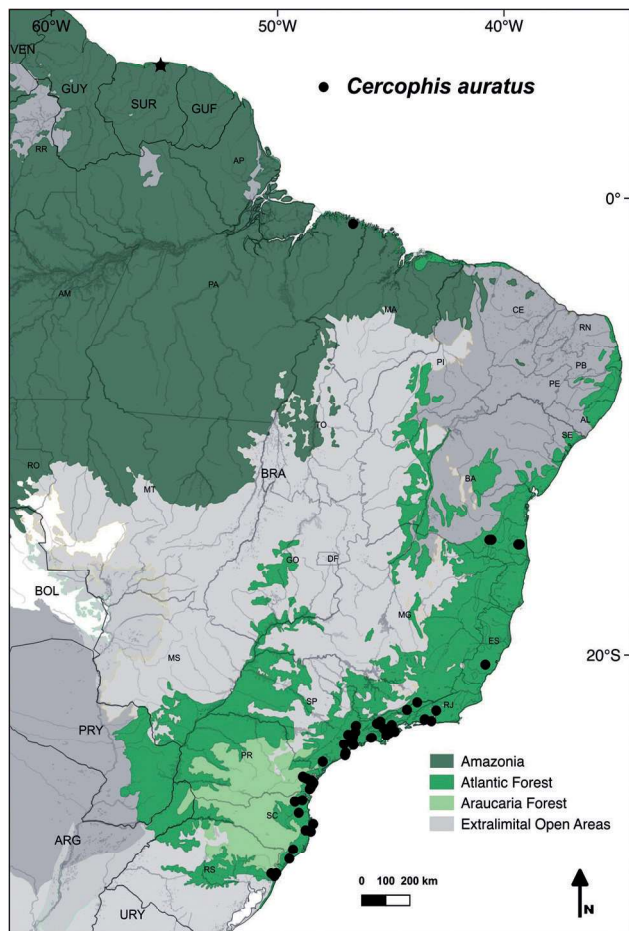


Figure 4. Distribution of *Cercophis auratus* based on all available data. The type locality (surroundings of Paramaribo, Suriname) is indicated with an asterisk. Map provided by Atlas of Brazilian Snakes Working Group (through C. Nogueira).

Castro and Silva-Soares, 2016). The only exception is provided by Müller and Ritter (1978), who report that the species is far from rare in the remaining forests on the southern part of the island of Florianópolis, Santa Catarina state, where they collected four specimens.

Our sample includes no more than 49 specimens from 14 collections, all collected over a period of about 200 years, confirming earlier indications that *Cercophis auratus* is a rather rare snake. No large series from one locality is available, most specimens have been collected (or observed) as singletons, and only a few lots of 2–4 specimens from the same locality are known (excluding a larger one consisting of juveniles hatched from eggs laid by one female (Cunha and Nascimento, 1982, 1993; Morato and Bérnils, 1989; Hoogmoed 1997a; Morato, 2005).

Regardless of the evidence of local rarity, *Cercophis auratus* is a widely distributed taxon, at least throughout the Atlantic Forest area where suitable habitats are still available as forest fragments. Further, the literature suggests that the ecological requirements of the species might extend beyond forested areas to Restinga in the southern (Lema, 1973) and northern (Castro and Silva-Soares, 2016) part of its Atlantic coast range. In Pará, specimens were collected on a farm with only remnants of degraded forest, suggesting that *C. auratus* may have some resilience to adverse habitat conditions. Finally, the cryptic habits and camouflaged morphology of the species might render detection of specimens in the field more difficult, contributing to our present perception of low local abundance.

The reported rarity of *Cercophis auratus* does not necessarily need to cause concern about its conservation status, as the species is rather widely distributed. However, the entire Brazilian coastal area (especially Atlantic Forest and Restinga) are under heavy pressure of diverse human activities (logging, clear cutting, and housing developments), and conservation strategies should especially focus on potential threats to habitat destruction and counter them with all possible political and legal means.

Although the species does not appear in the International Union for Conservation of Nature (IUCN) or Brazilian Red Data Books of species threatened with extinction (ICMBio, 2016), it is cited in Red Data Books/Lists of some Brazilian states, namely Pará (Anonymus, 2008: Vulnerable; Albernaz and Avila-Pires, 2009: “Threatened”), Espírito Santo (Passamani and Mendes, 2007: Data Deficient), and Rio Grande do Sul (Marques et al., 2002: Endangered; Di-Bernardo et al., 2003: Endangered; Martins and Molina, 2008: Endangered; Alvarez, 2011: Endangered). Almeida et al. (2007) did not mention *Uromacerina ricardinii* in the text or table of their chapter on endangered reptiles of Espírito Santo, but the species was considered to be Data Deficient in Annex 3 of the same book (Passamani and Mendes, 2007: 139). Other states where the species occurs and that developed Red

Data Books/Lists did not include the species. However, in the first version of the Red Data Book for Paraná, Morato et al. (1995: 131) mentioned that 11 species of snakes (including *U. ricardinii*) from the Atlantic Forest were very poorly known and for which, due to their stenoecious character, the destruction of the environment was a risk factor for their survival. At the time that would have been equivalent to the IUCN Data Deficient category, although the authors did not include the species as Data Deficient in the second version of their paper (Bérnils et al., 2004) because of changed IUCN criteria.

Further inventories in the Brazilian coastal area and in eastern Amazonia (including the Guianas) hopefully will provide more distribution and ecological data and show whether the perceived distribution disjunction in two areas is real or not. Also, such inventories should provide more data about its conservation status and (if needed) indicate possible conservation strategies to be applied.

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Sweden. T.C.S. Avila-Pires mounted Figure 2. J.L.R. Gasparini provided the portrait for Figure 3. F. Tillack (ZMB, Berlin) made photographs of all material examined by C. Kucharzewski, part of which were used in Figures 1 and 2. Furthermore we thank Annina Böhme (Niedersächsisches Landesmuseum, Hannover) for collection details of the *Cercophis auratus* specimen in the ZMB collection.

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Synonymization of *Uromacer Ricardinii* Peracca, 1897 with *Dendrophis aurata* Schlegel, 1837

(Reptilia: Squamata: Colubridae: Dipsadinae), a Rare South American Snake with a Disjunct Distribution

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APPENDIX 1

Specimens examined

Cercophis auratus ($n = 49$): BRAZIL: **Espírito Santo**: Parque Estadual Paulo César Vinha, Guarapari, IBSP 88488; **Minas Gerais**: Rio Preto (22°05'21"S, 43°49'40"W), MNRJ 7078; **Pará**: Augusto Corrêa: Fazenda Cacoal, MPEG 6511, 6656; **Paraná**: IBSP 24421; Pontal do Paraná: Balneário de Guarapari, MHNCI 7778; Pontal do Paraná: Balneário Shangrilá, MHNCI 4568, 4888; Pontal do Paraná: Balneário das Canoas, MHNCI 2180; Morretes: Estrada da Graciosa (PR 410), Mãe Catira, MHNCI 672, Serra da Graciosa, MHNCI 8134; Matinhos, MHNCI 9454; Paranaguá, IBSP 9327, IBSP 23312; Paranaguá, Praia de Leste, IBSP 1731; IBSP 22957. **Rio de Janeiro**: MCZ R 3674; Porto Real, RMNH 27672–73; BMNH 1897.4.8; Rio de Janeiro, Serra do Mendanha (22°50'12.3"S, 43°29'93.5"W), MNRJ 10948; (Duque de) Caxias, UMMZ 115649; Teresópolis, Granja Guarani, MNRJ 10948. **Rio Grande do Sul**: Maquiné, Estação de Piscicultura da Lagoa dos Quadros, MCN 3521. **Santa Catarina**: ZMH R 7736; Blumenau-Corupá, ZMB 66167–69; Blumenau, FURB 2156; Corupá, IBSP 11191; Araranguá, MHNCI 3152; Joinville, MNRJ 1855; Florianópolis, IBSP 42971, 43461; Florianópolis, Lagoa Ponta das Canas, MCN 8456; Uruçanga, MHNCI 10857. **São Paulo**: MZUT R 1769 (holotype *Uromacer Ricardinii*); MZUSP 4229; Taubaté (Quiririm), IBSP 8020; Taubaté: Parque Industrial, IBSP 40625; Atibaia (Guaxinduva), IBSP 810; São Luís do Paraitinga: Sta Virgínia (23°20'S, 45°08'W), IBSP 69144; Peruíbe (Juquiazinho), IBSP 42061; Pindamonhangaba, IBSP 12086, 22551; Jacupiranga: Vale do Ribeiro, IBSP 34412; Cananea, IBSP 45178; Juquitiba, IBSP 56185; Cunha, IBSP 4949; Salesópolis; AMNH 71308; São Paulo: Estação Ferroviária Rio dos Campos, IBSP 9422, 10240, Butantan, IBSP 3266, Perdizes, IBSP 54803, Serra da Cantareira, IBSP 9925, Vila Nova Conceição, IBSP 24455, Parelheiros, Bairro de Santo Amaro, IBSP 26868; Ubatuba, Lagoinha IBSP 33077; Juquiazinho: Sítio Três Corações, UMMZ 204204; Boituva, AMNH 71309. SURINAME: probably **Paramaribo**: RMNH 813 (holotype *Dendrophis aurata*). NO DATA: NMW 25186; SMF 49996.

Synonymization of *Uromacer Ricardinii* Peracca, 1897 with *Dendrophis aurata* Schlegel, 1837

(Reptilia: Squamata: Colubridae: Dipsadinae), a Rare South American Snake with a Disjunct Distribution

Marinus S. Hoogmoed, Ronaldo Fernandes, Christoph Kucharzewski, Julio Cesar Moura-Leite, Renato S. Bérnils, Omar Machado Entiauspe-Neto, Filipe Pereira Rêgos dos Santos

APPENDIX 2

Localities (coordinates only given when published) from the literature

Brazil

Bahia: Barra do Choça, Recanto da Adriana farm (14°57'32"S, 40°32'56"W) and Arataca, Monte Sião farm (15°09'38"S, 39°18'07"W; Argôlo, 2001); enclaves of ombrofilous forest on southern Bahian plateau (600–950 m) and mountains of the cacao region with ombrofilous forest (600 m; Argôlo, 2002: 451).

Espírito Santo: Marechal Floriano, Alto Nova Almeida near Sitio Três Marias (20°24'36"S, 40°49'26"W; Zamprogno, 1997); Restinga de Setiba (Gasparini, 2012); Guarapari, Restinga do Parque Estadual Paulo César Vinha (Castro and Silva-Soares, 2016).

Minas Gerais: Município Rio Preto (22°05'21"S, 43°49'40"W) (Ribeiro et al., 2004).

Pará: Município Augusto Corrêa, fazenda Cacoal (Cunha and Nascimento, 1982, 1993).

Paraná (Hoge, 1959): Pontal do Paraná, Balneário das Canoas, near Paranaguá (Morato and Bérnils, 1989).

Rio de Janeiro (Werner, 1909); (MCZ R 3674): Teresópolis (Gonçalves et al., 2007); Teresópolis (Granja Guarani; ZUFRJ 487; Bérnils, 2009); Porto Real (Hoogmoed, 1997a, b); Rio de Janeiro, Floresta da Tijuca (Lema, 2002).

Rio Grande do Sul: Terra de Areia, near Torres km 46 on road BR 101 (Lema, 1973); Maquiné, Lagoa dos Quadros (29°41'30"S, 50°08'30"W) (Lema, 1994; Bérnils, 2009; MCN 3521); Dom Pedro de Alcântara (Lema, 2002).

Santa Catarina (Marques, 1998): Ilha de Florianópolis, Lagoa Peri (Müller and Ritter, 1978); Florianópolis, Ponta das Canas (27°29'38"S, 48°26'12"; MCN 8456; R.B. de Oliveira, *in litt.*); Uruçanga (MHNCI 10857; Bérnils, 2009); Santo Amaro da Imperatriz (MNRJ 20255, Nogueira, *in litt.*).

São Paulo (Peracca, 1897; Hoge, 1959; Amaral, 1978; Marques, 2000): Barueri (IBSP 7361; Amaral, 1978; Bérnils, 2009); Ubatuba, Parque Estadual Serra do Mar, núcleo Picinguaba (23°23'S, 44°50'W) (IBSP 69144; Marques et al., 2004; Hartmann, 2006; Hartmann et al., 2009a), Ubatuba, Lagoinha (IBSP 33077; Bérnils, 2009); Bom Retiro (IBSP 32046) and Horto Florestal (IBSP 24053; both in Marques et al., 2009); Salésopolis, Estação Biológica de Boraceia (MZUSP 4229; Bérnils, 2009); Peruíbe, Juquiázinho (IBSP 25356; Bérnils, 2009); São Paulo (AMNH 71398); São Paulo, Vila Nova Conceição (IBSP 24455; Bérnils, 2009); São Paulo, Perdizes (IBSP 54803; Bérnils, 2009); São Paulo, Rio dos Campos (IBSP 9422; Bérnils, 2009); São Paulo, Serra da Cantareira (IBSP 9925; Bérnils, 2009); Taubaté (IBSP 40625; Bérnils, 2009); Jacupiranga (IBSP 34412; Nogueira, *in litt.*).

Suriname

Most likely surroundings of Paramaribo (Schlegel, 1837a, b; Hoogmoed, 1983, 1997a, b).