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A New Species of *Scinax* (Anura: Hylidae) from Southeastern Brazil, with Comments on the Genus

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ABSTRACT.—**A new species of treefrog of the genus *Scinax* is described from southern São Paulo, Atlantic Forest, in southeastern Brazil. The new species is a member of the *Scinax rubra* group characterized by moderate size, head longer than wide, snout nearly rounded in profile and subacuminate in dorsal view. Descriptions of the advertisement call and karyotype, as well as data on natural history, are provided. The inclusion of the species assigned presently to *S. x-signata* group in the *S. rubra* group is proposed.**

Fouquette and Delahoussaye (1977) resurrected the generic name *Ololygon* Fitzinger, 1843, for the hylid frogs of the *Hyla rubra* group (sensu lato). However, *Scinax* Wagler, 1830 type species *Hyla aurata* Wied-Neuwied, has priority over *Ololygon* (Pombal and Gordo, 1991; Duellman and Wiens, 1992). Duellman and Wiens (1992) resurrected and diagnosed the genus *Scinax* and recognized seven species groups for this genus: *S. catharinae* group, *S. perpusilla* group, *S. rizibilis* group, *S. rubra* group, *S. rostrata* group, *S. staufferi* group, and *S. x-signata* group. Some authors do not accept the inclusion of all these groups in only one genus (see Almeida and Cardoso, 1985; Haddad and Pombal, 1987; Pombal and Gordo, 1991).

Treefrogs of the *Scinax rubra* group occur from Mexico to Argentina and may have originated in South America (Léon, 1969). The largest number of species occurs in southeastern Brazil (see below).

The *Scinax rubra* group is characterized by small to moderate-size; vocal sac single, median, subgular; snout not pointed; posterior surfaces of thighs with flash colors; advertisement call with multipulsed notes; generally breeding in open areas. The species known from southeastern Brazil (see remarks) are: *S. altera* (B. Lutz), *S. caldarum* (B. Lutz), *S. crospedospila* (A. Lutz), *S. cuspidata* (A. Lutz), *S. duartei* (B. Lutz), *S. eurydice* (Bokermann), *S. fuscovaria* (A. Lutz), *S. hayii* (Barbour), *S. maracaya* (Cardoso and Sazima), *S. nasica* (Cope) (considered in the *S. staufferi* group by Duellman and Wiens, 1992), and *S. similis* (Cochran). Herein, we describe a new species of the *S. rubra* group from the Atlantic Forest southern São Paulo State, southeastern Brazil.

MATERIAL AND METHODS

Specimens used in the description or examined for comparisons are in MNRJ (Museu Nacional, Rio de Janeiro, Brazil); MZUSP (Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil); UFMT (Universidade Federal do Mato Grosso, Mato Grosso, Brazil); WCAB (Werner C. A. Bokermann, collection, São Paulo, Brazil); and ZUEC (Museu de História Natural, Universidade Estadual de Campinas, Campinas, São Paulo, Brazil). Webbing formula notation follows Savage and Heyer (1967) as modified by Myers and Duellman (1982). Measurements are in millimeters.

Vocalizations were recorded with a Nagra-E tape recorder and a Sennheiser ME 80 microphone at a tape speed of 19 cm/sec. Tapes were analyzed on a MacIntosh Classic coupled to MacRecord® Sound System 2.0.5. Abbreviations are: SVL (snout-vent length), HL (head length), HW (head width), ED (eye diameter), IOD (interorbital distance), END (eye-nostril distance), TD (tympanum diameter), THL (thigh length), TBL (tibia length), and FL (foot length).

Mitotic and meiotic chromosomes were obtained following the methodology described by Baldissera et al. (1993) for anurans. Conventional staining was done with Giemsa, and Ag-NOR staining was done according to the technique of Howell and Black (1980).

Scinax perereca, sp. nov.
(Figs. 1 and 2)

Holotype.—ZUEC 9179, adult male, collected at the Fazendinha São Luis (approximately 24°13'S; 48°46'W; 800 m above sea level), Município de Ribeirão Branco, Estado de São Paulo, Brasil, on 7-11 December 1992, by José P. Pombal, Jr. and Célio F. B. Haddad.

Paratopotypes.—MNRJ 16601-04, MZUSP 69637-39, WCAB 49666-68, ZUEC 9181-9187, adult males, and ZUEC 9180, adult female, all collected with the holotype.

Diagnosis and Comparison with Other Species.—A medium sized species (males 34.0-38.5 mm

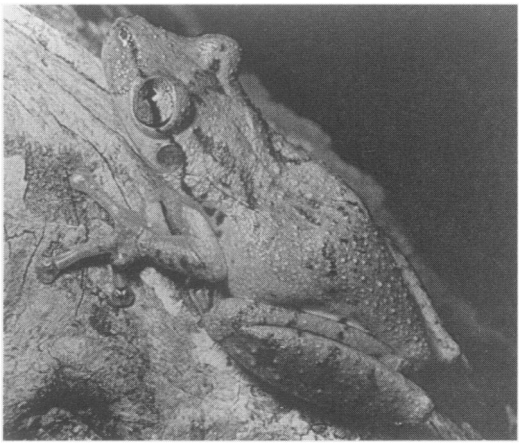

FIG. 1. *Scinax perereca*, holotype (ZUEC 9179) in life.

SVL), body moderately robust (Fig. 1), belonging to the *S. rubra* group, characterized by head longer than wide, snout nearly rounded in profile and subacuminate in dorsal view; canthus rostralis straight; in life iris copper colored, and surfaces of thighs and hidden portions of shank with yellow flash color on black background.

By its larger size, *Scinax perereca* is distinguished from *S. altera*, *S. caldarum*, *S. crospedospila*, *S. cuspidata*, *S. duartei*, *S. maracaya*, and *S. nasica* (SVL = 22.0–35.0, Bokermann, 1967a; Cardoso and Sazima, 1980; B. Lutz, 1973). From *S. nasica* it differs further by its larger adhesive disks. The new species differs further from *S. altera*, *S. crospedospila*, *S. duartei*, *S. fuscovaria*, *S. hayii*, and *S. nasica* by the advertisement call (Bokermann, 1967a, b, where *S. altera* is called *S. fuscomarginata*; De La Riva, 1993; Heyer et al., 1990). From *S. eurydice* and *S. fuscovaria* the new species differs by its smaller size (SVL = 41.2–52.0, Bokermann, 1968; B. Lutz, 1973). From *S. altera*, *S. caldarum*, *S. crospedospila*, *S. cuspidata*, *S. duartei*, *S. eurydice*, *S. fuscovaria*, *S. hayii*, *S. maracaya*, and *S. similis* the new species differs by its color pattern (see Bokermann, 1967a, 1968; Cardoso and Sazima, 1980; B. Lutz, 1968, 1973; Heyer et al., 1990). From *S. similis* it differs further by a less rounded snout in dorsal view.

Description of Holotype.—Body moderately robust (Fig. 1); head as wide as the body, longer than wide; snout moderate-sized, nearly rounded in lateral view and subacuminate in dorsal view (Fig. 2A, B); nostrils directed laterally; canthus rostralis distinct, straight; loreal region slightly concave; eye large, protruding; tympanum medium, nearly rounded, slightly larger than the adhesive disk of the 3th finger; supratympanic fold weak; vocal sac single, externally expanded; vocal slits present; tongue large, shallow notched posteriorly, barely free behind; vomerine teeth in two straight series, little separated and between choanae; choanae small, slightly elliptical and oblique. Forearm moderately robust, arm slender; fingers medium sized; subarticular tubercles single, conical on 1st and 2nd fingers, rounded on 3th and 4th fingers; supernumerary tubercles on 1st finger; outer palmar tubercle elevated, bifid; inner palmar tubercle elliptical; finger disks large, nearly rounded, wider than long; vestigial webbing between fingers (Fig. 2C); large, unpigmented nuptial excrescences on inner surfaces of thumb. Legs moderately robust; toes moderately long; inner metatarsal tubercle, ovoid (Fig. 2D); outer metatarsal tubercle nearly elliptical; subarticular tubercles single, conical; supernumerary tubercles small; webbing formula I2$^+$-2II1-2$^+$III1-2IV2-1V; toe disks elliptical, wider than long, nearly as large as those of the fingers. Skin on dorsum and throat smooth; that on belly and undersurfaces of thighs granular.

Color in Preservative of the Holotype.—Dorsum brown with dark brown spots; throat and venter white; white spots present on upper surfaces of thighs and hidden portions of shank; tibia with three dark brown transverse stripes.

Color in Life of the Holotype.—Dorsum greenish yellow with dark gray spots, dark gray inverted triangular interocular spot; venter yellow; throat pink; tympanum brown; iris copper with black bar, black line across canthus rostralis, eye, and supratympanic fold; tibia with three distinct dark gray transversal stripes; anterior and posterior surfaces of thighs and hidden portion of shanks with irregular spots yellow "flash" color on black background.

Measurements of the Holotype.—SVL 35.5; HL 11.8; HW 10.9; ED 3.6; IOD 3.6; END 3.4; TD 2.1; THL 17.0; TBL 18.0; FL 15.4.

Variation.—In preservative, dorsum gray to greenish-gray; most specimens with inverted triangular interorbital spot, some specimens with W-shaped, one individual with two dots in the interorbital area; some specimens with a pair of inverted dorsolateral parentheses, some with indistinct light dorsum pattern. Number and size of supernumerary tubercles variable. Measurements (mean, range, SD) of eighteen males, followed by one female in parentheses: SVL 36.61, 34.0–38.5, 1.20 (42.2); HL 12.36, 11.4–13.7, 0.60 (14.0); HW 11.51, 10.9–12.4, 0.46 (13.2); ED 3.96, 3.6–4.4, 0.28 (4.4); IOD 3.96, 3.6–4.4, 0.29 (5.0); END 3.77, 3.4–4.4, 0.24 (4.1); TD 2.12, 1.9–2.4, 0.15 (2.6); THL 17.19, 15.9–18.7, 0.65 (20.1); TBL 18.59, 17.8–19.9, 0.64 (20.0); FL 15.99, 15.4–16.8, 0.58 (18.3).

Vocalization.—Advertisement calls are given frequently (range = 18–50 notes/min). Analysis of two recordings reveals a call duration of 0.28–

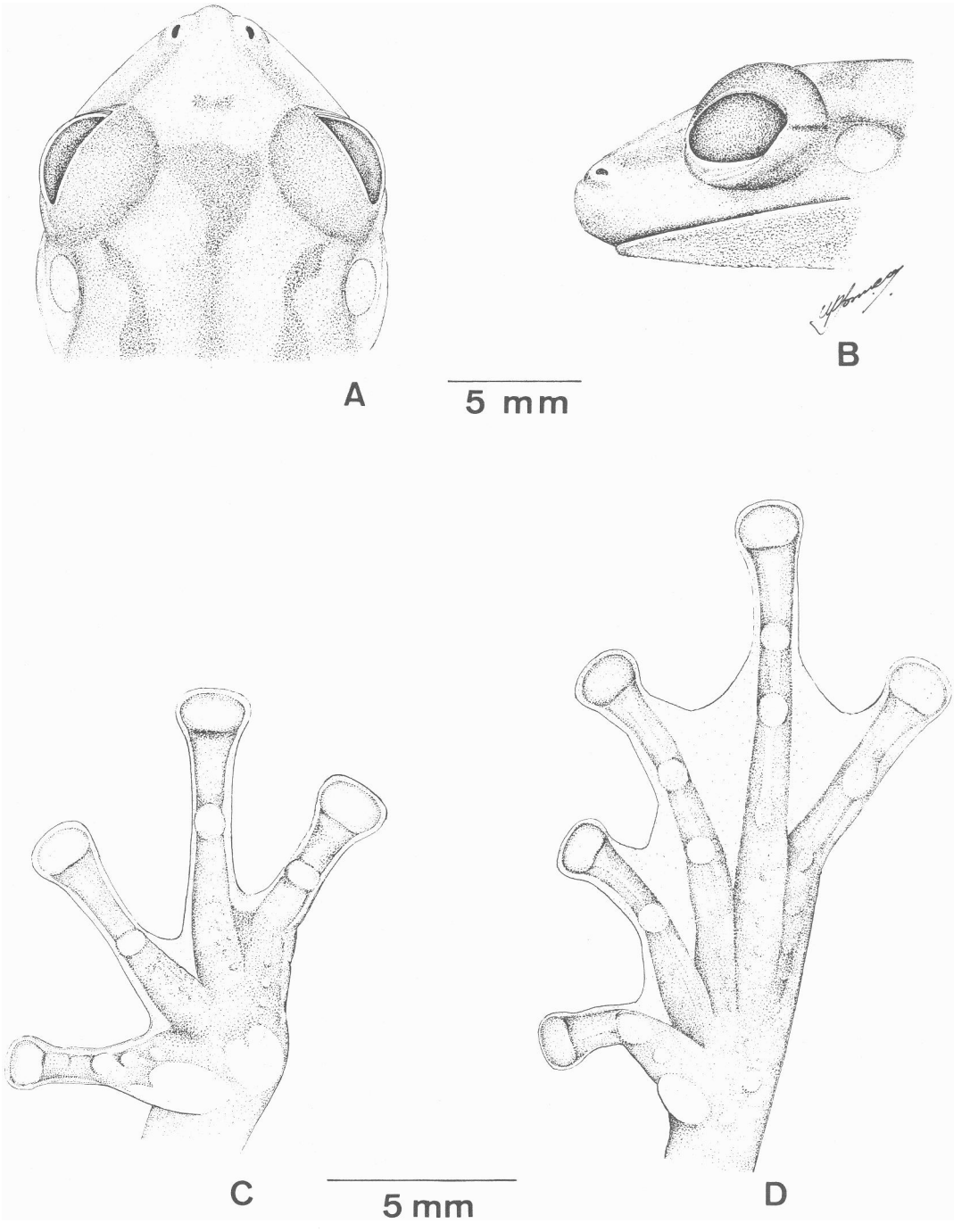

FIG. 2. *Scinax perereca*, holotype (ZUEC 9179). (A) Dorsal and (B) lateral views of head; ventral views of (C) hand and (D) foot.

0.35 sec; this sound is pulsed, with pitch varying between approximately 0.8–3.9 kHz (Fig. 3A). Encounter calls are given sporadically. Analyses of six recordings reveal a duration of 0.08–0.21 sec, apparently with harmonic structure and frequency modulation (Fig. 3B).

Karyotype.—Preliminary cytogenetic data of *S. perereca* are based on mitotic chromosome

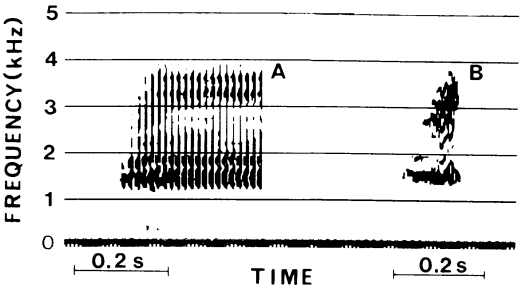

FIG. 3. Vocalizations of *Scinax perereca*. (A) Advertisement call (ZUEC 9187), recorded on 8 December 1992, air temperature 18.5 C, water temperature 23.5 C; (B) Encounter call, recorded on 21 December 1992, air temperature 22 C, water temperature 25 C.

analyses of two males collected with the type series. A diploid number of 2n = 24 was found in both specimens and the karyotype includes six pairs of chromosomes of great size and six pairs of small size (Fig. 4A). In the former group the pair 1 is metacentric whereas the remainder are submetacentric and showing a gradual variation in size. The second group is formed by metacentric or submetacentric chromosomes with slight differences in size, except the pair 12 which is the smallest. This pair is involved in the organization nucleolus as evidenced by the location of the NORs at the telomeric region of the long arms (Fig. 4B). Meiotic analysis revealed 12 bivalents at diplotene and metaphase I, and 12 chromosomes at metaphase II, thereby confirming the diploid number observed in the somatic cells.

Natural History.—Males were recorded calling throughout the year. They were observed at night in open areas or forest edges, near permanent ponds and perched on vegetation from 25–100 cm above the ground ($\bar{x}$ = 66.0, SD = 23.47, N = 11), with head directed upward. Males call frequently; most of calling activity occurs in the beginning of the night, approximately from sunset to four hours after sunset. Egg clutches and tadpoles are unknown. *Scinax perereca* was observed sheltered in human habitations at the type locality.

Distribution.—The new species is known from the type locality and municipality of Eldorado, in the Rio Ribeira Valley. We also found *S. perereca* at the Estação Ecológica de Juréia-Itatins in the municipality of Iguape (approximately 400 m above sea level); all localities are of Atlantic Forest in southern São Paulo State.

Etymology.—Perereca is a Tupi indigenous

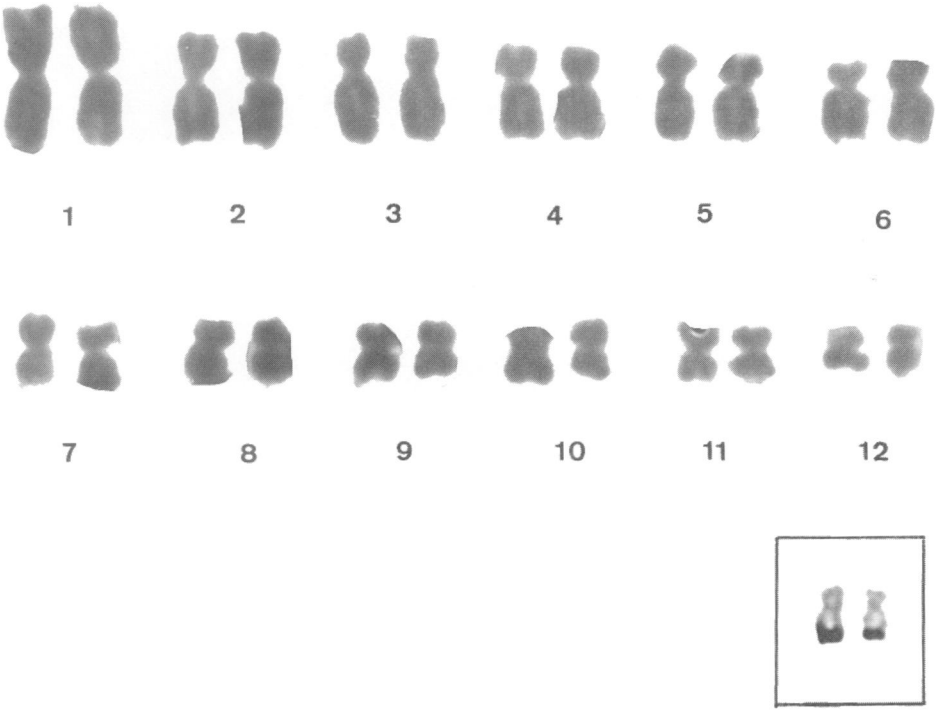

FIG. 4. Karyotype (mitotic) of a male specimen of *Scinax perereca*, with 2n = 24, after Giemsa staining; insert: chromosome pair 12 with Ag-NOR staining.

name, here used as a noun in apposition. This is a name frequently used to designate hylid frogs (mainly *Scinax rubra* group), by most people in Brazil.

Remarks

The composition of *Scinax x-signata* group is highly variable and confusing in the literature (e.g., Cochran, 1955; B. Lutz, 1973; Fouquette and Delahoussaye, 1977; Frost, 1985) apparently as a consequence of the ignorance about what populations may be called *S. x-signata*. The holotype of *S. x-signata* apparently is lost (Hoogmoed and Gruber, 1983) and the description of Spix (1824) or the redescriptions by subsequent authors (e.g., Cochran, 1955; Rivero, 1969; B. Lutz, 1973; Heyer et al., 1990) precludes correct identification. In Brazilian museum collections several species are identified as *S. x-signata*. For this reason we did not compare the new species to *S. x-signata*. We propose the inclusion of the species assigned to the *S. x-signata* group, by Duellman and Wiens (1992), in the *S. rubra* group, based on morphological similarities and on vocalizations of the species allocated to these two groups.

In the recent revision of the genus *Scinax* Duellman and Wiens (1992) did not assign the species group for 11 species. Almeida and Cardoso (1985) presented a characterization of the *S. rubra* and *S. catharinae* groups based on calling type and breeding habitat. Based on breeding habitat, morphology, and advertisement call, we propose the inclusion of six of these species in two preexistent groups (see Duellman and Wiens, 1992): *S. canastrensis* (Cardoso and Haddad) and *S. longilinea* (B. Lutz) in the *catharinae* group; *S. duartei* (B. Lutz), *S. eurydice* (Bokermann), *S. maracaya* (Cardoso and Sazima), and *S. pachycrus* (Mir.-Rib.) in the *S. rubra* group. (*Scinax pachycrus* was consistently misspelled by several authors.)

Populations identified as *S. altera* may represent more than one species; there are populations with distinct color patterns and differences in size (B. Lutz, 1973; pers. obs.). *Scinax duartei* also shows a great geographic variation (Bokermann, 1967a; pers. obs.), and the status of these populations needs revision.

Fouquette and Delahoussaye (1977) considered *S. trachythorax* (Müller and Hellmich) and *S. megapodia* (Mir.-Rib.), this latter considered as a junior synonym of *S. fuscovaria* (Cei, 1980; B. Lutz, 1973), as two valid species of the *S. catharinae* group. *Scinax fuscovaria* is assigned to the *S. rubra* group by Duellman and Wiens (1992), who considered *S. megapodia* as a synonym of this species. A study of several populations is needed to assess the validity of the names *trachythorax* and *megapodia*.

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APPENDIX

Additional Specimens Examined.—Scinax acuminata ZUEC 1142–43. *S. altera* ZUEC 543–44, 4732–35, 4740–41, 4743, 4746, 4749–53, 4755, 4772–73, 4897, 5160, 5326, 5885–89, 6019, 6398, 6872, 7530, 7725, 7960–61, 7970, 7989, 8958. *S. caldarum* ZUEC 4130, 4144, 4231, 4307–08, 4547–48, 6256, 8290–91, 8346, 8349–51, 8353 (topotypes). *S. canastrensis* MNRJ 4147 (holotype), 4148 (paratype); ZUEC 4188–91, 4193 (paratype). *S. crospedospila* ZUEC 3705, 5223, 6428. *S. cuspidata* ZUEC 2229–30 (topotypes). *S. duartei* ZUEC 656–58, 660–62, 665, 667–71, 2855 (topotypes); 4279; 5248–49 (topotypes); 6337–39, 6599–6502; 6929–30, 7509, 7990, 8149–53 (topotypes); 8217–19; 8304–05 (topotypes). *S. eurydice* MZUSP 59912–14 (topotypes), 63543; ZUEC 2173, 2186, 3748–49. *S. fuscovaria* ZUEC 121, 293, 299, 302, 1227–30, 3900, 4025, 4172, 4453, 5879, 5880–83, 6024, 6156, 6867–68, 7508, 7705–08, 8030, 8338, 8352, 8919, 8991. *S. hayii* ZUEC 574, 1120, 1122, 1330, 2620–22, 3617, 5878, 6021–22, 6145–48, 6315–17, 6359, 6874–75, 7943–44. *S. longilinea* ZUEC 5360–65, 7600–18. *S. maracaya* ZUEC 4099 (paratype); 4100–01; 4132–35 (topotypes); 4345, 7931–33; 8224–25, 8300–02 (topotypes). *S. nasica* ZUEC 1148–50. *S. pachycrus* ZUEC 1202–06, 8320–21. *S. perereca* UFMT 2018–19. *S. similis* MZUSP 62959–60 (topotypes); ZUEC 2989, 2991–97. *S. vauterii* MZUSP 13782, 36077, 36088–93, 57535–39; WCAB 48027–28.