

Annotated list of Veronicellidae from the collections of the Academy of Natural Sciences of Philadelphia and the National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A. (Mollusca: Gastropoda: Soleolifera)

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Abstract.—The list of veronicellid slugs presented in this paper is restricted to species identified by criteria previously proposed by the first author. We were able to distinguish 30 species or subspecies, classified in 12 genera. Included are the following: *Belocaulus angustipes*; *Colosius propinquus*; *C. pulcher*; *Diplosolenodes occidentalis*; *D. olivaceus*; *Heterovaginina peruviana*; *Laevicaulis alte* (with new illustrations); *L. natalensis brauni*; *L. stuhlmanni* (with new illustrations); *Latipes cnidicaulus*; *Leidyula dissimilis*; *L. floridana* (with new data and illustration); *L. goodfriendi*; *L. kraussi*; *L. moreleti*; *L. portoricensis*; *L. trichroma*; *Phyllocaulis gayi*; *P. soleiformis*; *Sarasinula dubia*; *S. linguaeformis*; *S. plebeia*; *Simrothula columbiana*; *S. prismatica*; *Vaginulus taunaisii*; *Veronicella bahamensis*; *V. cubensis*; *V. davisii*; *V. sloanei*; *V. tenax*.

The family Veronicellidae Gray, 1840 comprises terrestrial mollusks without shell, commonly called slugs. The distribution is pantropical and over 300 specific names have been registered, most of them synonyms (Hoffmann 1925, Forcart 1953, Thomé 1975a, 1993b).

The phylogenetic position of the Veronicellidae is uncertain. Usually they are classified within the order Soleolifera Simroth, 1890. Some North American authors classify them in the order Systelommatophora Pilsbry, 1948. Others propose placing them in another order of Pulmonates: Archaeopulmonata (Götting 1974). Zilch (1959/60) put the Soleolifera as an Order of the subclass Euthyneura. Colosi (1922) and Hyman (1967) placed the same as an Order of the class Opisthobranchia.

Thomé (1993b) discusses the classification status of American Veronicellidae, points out the necessity of embryological and ontogenetic studies, and suggests new

groups of characteristics to be analyzed. He comments on the characteristics traditionally used and is of the opinion that there are not enough to determine conclusively the species, and that they do not permit a consistent phylogenetic classification.

The objective of the present work is to identify species of Veronicellidae from two collections through the classical anatomical characteristics proposed by Thomé (1993b). This list is relevant due to the importance of these North American institutions' collections for comparative study of Veronicellidae.

Materials and Methods

The analyzed material belongs to the following Museums: The Academy of Natural Sciences of Philadelphia (ANSP) with 110 lots and 464 specimens; and The National Museum of Natural History, Smithsonian Institution, Washington (USNM) with 97 lots and 272 specimens. Some of these lat-

ter lots were intercepted in the United States by US Department of Agriculture (USDA) and bear the occurrence number.

The specimens were dissected according Thomé & Lopes (1973) and the anatomical characteristics used for identification were based on Thomé (1988a, 1993b).

We have included illustrations only for those species where new data made it necessary for their complete description.

The radula and the jaw of some specimens were analyzed by Scanning Electron Microscope (SEM), using the method of Götting (1985).

The synonymy is restricted to main reference works. The occurrences are those cited in Thomé (1993b) with new data from these collections.

Results

Belocaulus angustipes (Heynemann, 1885)

Vaginula angustipes Heynemann, 1885: 275–77.

Belocaulus angustipes; Lopes-Pitoni & Thomé, 1981:586–93; Thomé, 1993b:70.

Occurrence.—Argentina; Brazil: Rio Grande do Sul; Paraguay; Colombia; (introduced: Honduras; U.S.A: Florida, Alabama, Louisiana, Texas).

Examined lots.—ANSP A1438. U.S.A: Florida, Leon County, Tallahassee; L. T. Rose leg; 12 Oct 1967; (Elberta Carte Co. property, East side of the international airport, Dr. Lake Bradford Rd); (3 specimens). USNM 574919. Colombia; 5 Nov 1943; (on *Anthurium* sp., USDA 200372); (1 specimen). USNM 575531. U.S.A: Alabama, Mobile; L. Hubricht leg; Jun 1961; (Mobile Co., Old Church Street, USDA 237188); (3 specimens). USNM 576363. U.S.A: Louisiana, New Orleans; 12 Sep 1962; (on lawn, USDA 244560); (1 specimen). USNM 758251. U.S.A: Louisiana, New Orleans; D. Dundee leg; 1963; (4 specimens). USNM 769131. U.S.A: Texas, Brownsville; D. L. Dunagan leg; 27 Mar 1968; (La Verne's Nursery, USDA 278478); (8 specimens). USNM 769164.

U.S.A: Texas, Raymondville; R. Kloeping leg; 11 Apr 1968; (Caldwell Nursery, USDA 278478); (1 specimen). USNM 769169. U.S.A: Texas, Brownsville; 29 Apr 1969; (USDA 288982); (1 specimen). USNM 769170. U.S.A: Texas, Harington; R. Kloeping leg; 12 Apr 1968; (Rainbow Nursery, USDA 278478); (1 specimen). USNM 769175. U.S.A: Texas, Edinburg; W. J. Bone leg; 08 Feb 1968; (Mac's Nursery; Hidalgo Co., USDA 273170); (9 specimens). USNM 769176. U.S.A: Texas, Raymondville; R. Kloeping leg; 30 Jan 1968; (La Verne's Nursery; USDA 273170); (5 specimens). USNM 769178. U.S.A: Texas; W. J. Bone leg; 8 Feb 1968; (McAllen; Waugh Nursery, USDA 273170); (1 specimen). USNM 769180. U.S.A: Texas, San Benito; O. V. Mullins leg; 30 Jan 1968; (Bougainville Nursery, USDA 273170); (6 specimens). USNM 769187. U.S.A: Texas, Brownsville; B. C. Stephenson leg; 30 Jan 1968; (Tropical Nursery; Cameron Co., USDA 273170); (2 specimens). USNM 769196. U.S.A: Texas, Corpus Christi; E. F. Sublett leg; 23 Apr 1968; (Backyard Nursery, Nueces Co., USDA 278478); (1 specimen). USNM 769198. U.S.A: Texas, San Benito; O. V. Mullins leg; 12 Apr 1968; (Brown Lee Farm; Cameron Co., USDA 278478); (6 specimens). USNM 769199. U.S.A: Texas, San Benito; D. L. Dunagan leg; 9 Apr 1968; (Bougainville Nursery, Cameron Co., USDA 278478); (3 specimens). USNM 791487. U.S.A: Florida, Pensacola; J. P. E. Morrison leg; Dec 1961; (1 specimen).

Colosius propinquus (Colosi, 1921)

Vaginula propinqua Colosi, 1921:157; Colosi, 1922:499–500.

Angustipes (Angustipes) pulcher; Kraus, 1953:63 (p.p.).

Occurrence.—Ecuador; U.S.A: Puerto Rico.

Examined lot.—ANSP A1440. Porto Rico: Yauco river, Yaves Lares; H. B. Baker; (8 specimens).

Colosius pulcher (Colosi 1921)

Vaginula pulchra Colosi, 1921:157; Colosi, 1922:496–98; Thomé, 1970b:23–5, 27–9, 31.

Angustipes (Angustipes) pulcher; Kraus, 1953:63 (p.p.).

Colosius pulcher; Thomé, 1993b:72.

Occurrence.—Ecuador; Antilles: Dominican Republic.

Examined lots.—ANSP A1092. St. Domingo; W. M. Gabb leg; (7 specimens). USNM 769142. Ecuador; 18 Mar 1969; (intercepted at Miami on bromeliads); (1 specimen).

Diplosolenodes occidentalis (Guilding 1825)

Onchidium occidentale Guilding, 1825:322.

Diplosolenodes occidentalis; Thomé, 1985: 411–17; 1993b:71.

Occurrence.—Guyana; Venezuela; Colombia; Panama; Costa Rica; El Salvador; Nicaragua; Honduras; Antilles: Dominica, W. I.; Bahamas; U. S. A: Hawaii.

Examined lots.—ANSP A1076. Nicaragua; W. G. Binney leg; (2 specimens). ANSP A1079. Panama: Punta de Piña, R. E. B. Mc Kenney leg; 11 Jan 1907; (1 specimen). ANSP A1080 (=71911). Dominica, W. I.; T. D. A. Cockerell leg; (3 specimens). ANSP A1083. Costa Rica: Rio Surubrer, Bonnefil farms; P. Calvert leg; 16 Oct 1909; (2 specimens). ANSP A1086 (=46583). Colombia: Aracataca; (1 specimen). ANSP A1095 (=57954). Dominican Republic; G. E. & A. H. Verrill leg; 1892; (1 specimen). ANSP A1098 (=140994). Venezuela: Palma Sola; H. B. Baker; 1920; (1 specimen). ANSP A1107a (=45180). A. A. Hinkley leg; 1914; (4 specimens). ANSP A1123. Panama: Flamenco Island, Canal Zone; N. L. H. Krauss leg; 29 Oct 1948; (1 specimen). ANSP A7018. British Guiana, (4°0' N, 58°0' W); H. Lang leg; (1 specimen). ANSP A7019. British Guiana, (4°0' N, 58°0' W); (2 specimens). ANSP A7022. British Guiana: Georgetown, (6°46' N,

58°10' W); Lang leg; (1 specimen). USNM 574369. U.S.A: Hawaii, Oahu Island, Eka-hanui Gulch; G. S. Starkey leg; 08 May 1945; (from Army Medical Museum, USDA 171519); (1 specimen). USNM 575267. Panama: Cathedral Plaza; J. Zetek leg; (USDA 215629); (1 specimen). USNM 575897b. Honduras; 24 Jan 1961; (intercepted at Charleston on bananas, USDA 234701); (1 specimen). USNM 575973. Bahamas; 20 Oct 1959; (intercepted at Miami on orchids, USDA 227708); (7 specimens). USNM 575975. El Salvador; 15 Jun 1960; (intercepted at Miami on orchids, USDA 231346); (1 specimen). USNM 576190. Nicaragua: Ticuantepe, El Mamon; 20 May 1957; (on plants, USDA 216243); (1 specimen). USNM 805216. Honduras: Bantua; G. W. Van Hyning leg; 03 Oct 1929; (1 specimen).

Diplosolenodes olivaceus (Stearns 1871)

Veronicella olivacea Stearns, 1871:1.

Diplosolenodes olivaceus; Thomé & Lopes-Pitoni, 1976:710–12.

Occurrence.—Nicaragua.

Examined lot.—USNM 39160. Nicaragua: Hacienda Polvón, Departamento de León. J. A. McNiel leg; 1885. (Lectotype).

Heterovaginina peruviana (Kraus 1953)

Vaginina (Heterovaginina) peruviana Kraus, 1953:63–5.

Heterovaginina peruviana; Thomé, 1969: 357.

Occurrence.—Peru.

Examined lot.—USNM 574941. Peru; 01 Feb 1954; (intercepted at New Orleans, on cabbage from Peru, USDA 201313); (1 specimen).

Laevicaulis alte (Férussac 1821)
(Figs 2, 5, 8, 11)

Vaginulus alte Férussac, 1821:14.

Laevicaulis alte; Forcart, 1953:63–8.

Occurrence.—Asia (type locality: Pon-

dichery, India); Oceania; Africa; (introduced?: Bermudas; U.S.A: Texas, Hawaii).

Examined lots.—ANSP A1130/1 (=98631). Bermudas: near Harrington House; S. Brown leg; Jun 1909; (45 specimens). ANSP A1130/2. Bermuda, near Harrington House, Parish; 18 Feb. 1908; (12 specimens). ANSP A10173 (=28314). U.S.A: Texas, Brownsville; 25 Sep 1983; (1515 Flamingo, Cameron Co.); (7 specimens). USNM 187499. U.S.A: Hawaii, Hilo; D. B. Kuhms leg; 17 Aug 1901; (2 specimens). USNM 574368. U.S.A: Hawaii, Oahu Island, Ekahanui Gulch; W. B. Lewellen and W. W. White leg; 31 Jan 1945; (on sewerage system, from Army Medical Museum, USDA 171519); (1 specimen). USNM 574371. U.S.A: Hawaii, Oahu Island, Honolulu; (USDA 171297); (2 specimens). USNM 574943. U.S.A: Hawaii, Midway Island; Lulhilson leg; 13 Nov 1953; (intercepted at Honolulu, on *Poinsettia* in soil from Midway, USDA 200540); (3 specimens). USNM 576340. U.S.A: Hawaii, Oahu Island, Kailua; 1 Aug 1960; (USDA 232396); (1 specimen). USNM 769190. U.S.A: Hawaii; 21 Oct 1968; (intercepted at San Antonio, Texas with shipment of *Achatina fulica* to S. W. State Teachers College, San Marcos, Texas, USDA 278478); (1 specimen).

Laevicaulis natalensis brauni
(Simroth 1913)

Vaginula (Annulicaulis) brauni Simroth, 1913:187.

Laevicaulis natalensis brauni; Forcart, 1953:71–4.

Occurrence.—Africa: South Africa.

Examined lot.—ANSP A1106 (=47326). Africa, South Africa: Port Shepstone; H. C. Burnup; (2 specimens).

Laevicaulis stuhlmanni (Simroth 1895)
(Figs 1, 1a, 4, 7, 10)

Vaginula stuhlmanni Simroth, 1895: 61.

Laevicaulis stuhlmanni stuhlmanni; Forcart, 1953:74–6.

Occurrence.—Africa: Zaire.

Examined lots.—ANSP A1137. Rotachuru (?); Dr. J. Beguait; Sep 1914; (2 specimens). ANSP A1138. Belgian Congo (=Zaire); 1919; (3 specimens).

Latipes cnidicaulis (Baker 1926)

Vaginulus (Latipes) cnidicaulis Baker, 1926:29–31; Thomé, 1988c:25–7.

Latipes cnidicaulis; Thomé, 1993b:72.

Occurrence.—Guyana.

Examined lot.—ANSP A7020. (=A5927); Guiana: Kamakusa; H. Lang leg; Jan 1923. (Holotype).

Leidyula dissimilis (Cockerell 1892)

Veronicella dissimilis Cockerell, 1892:134.
Leidyula dissimilis; Thomé, 1988b:808–09; 1993b:71.

Occurrence.—Antilles: Jamaica.

Examined lots.—ANSP A1451. H. B. Baker; 20 Jul 1933; (7 specimens). ANSP A1453. H. B. Baker; 8 Sep 1933; (1 specimen). ANSP A1456. 27 Jun 1933; (3 specimens). ANSP A12219 (=291339a); Jamaica: Somerset; H. B. Baker leg. (Holotype of *Veronicella leptothali* Baker, 1935. ANSP A12220 (=291339b); same data. (6 specimens). (Paratypes of *Veronicella leptothali* Baker, 1935).

Leidyula floridana

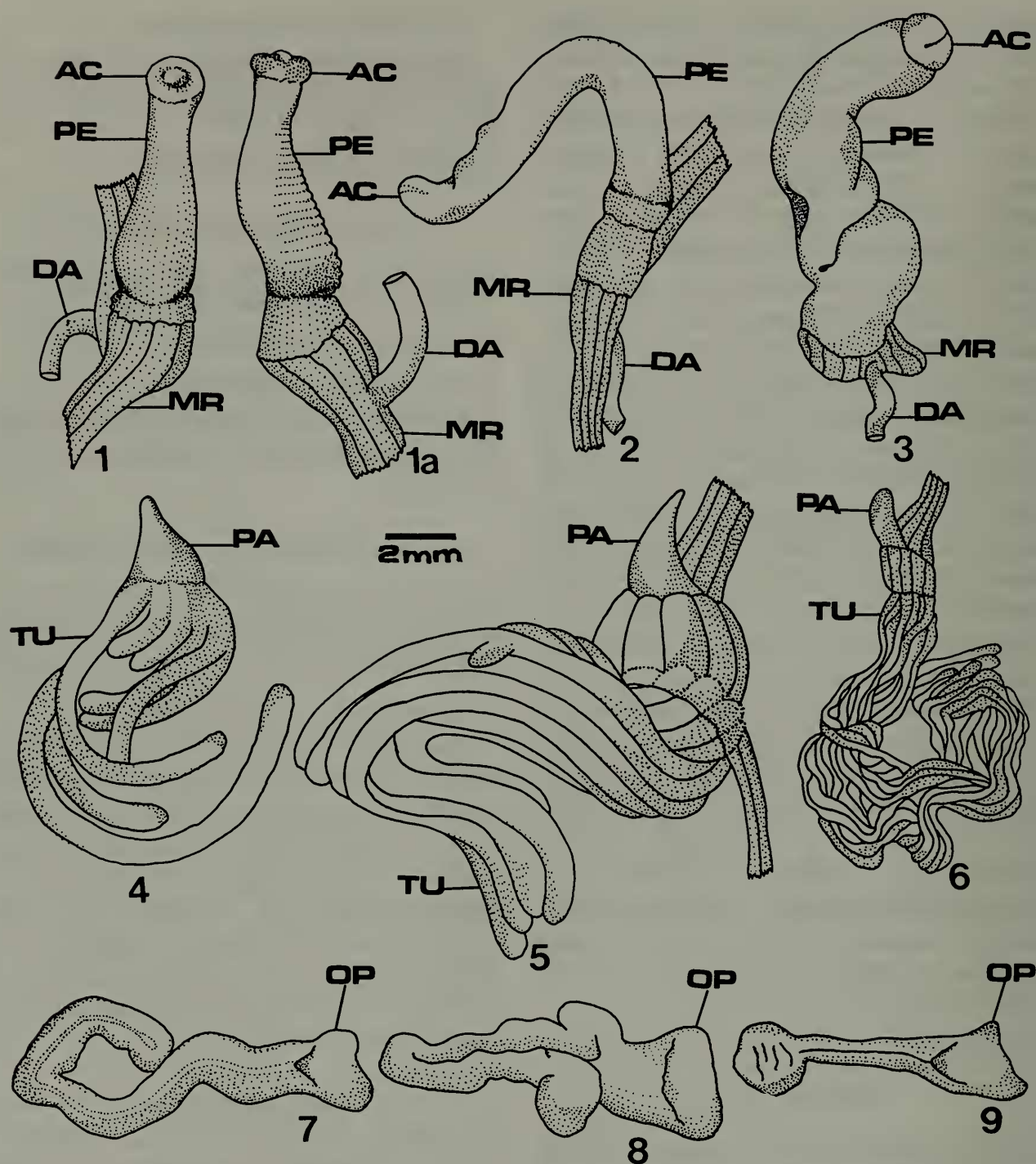
(Leidy & Binney in Binney 1851)
(Figs 3, 6, 9, 12)

Vaginulus floridanus Leidy & Binney in Binney, 1851:198, 251.

Leidyula floridana; Baker 1925:167–71; Thomé, 1993b:74.

Occurrence.—Antilles: Dominica W. I.; Cuba. U.S.A: Puerto Rico, Florida, Texas.

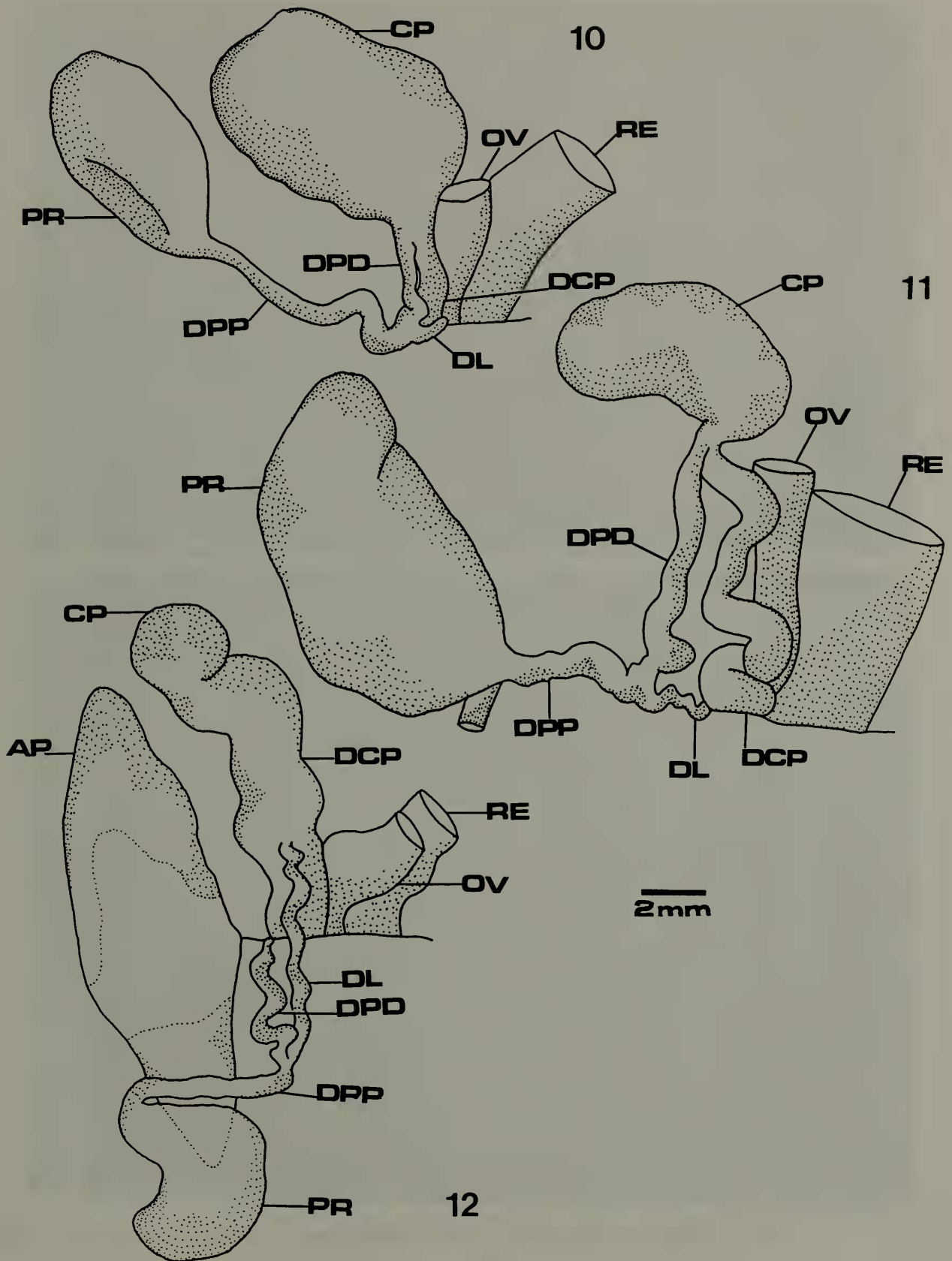
New data.—The jaw presents about 26 flattened laths, sometimes imbricate and of different sizes. The laths have small transverse furrows on the upper third. On some laths the furrows are lengthwise. The mid-region of the jaw is larger than the ends (Figs.



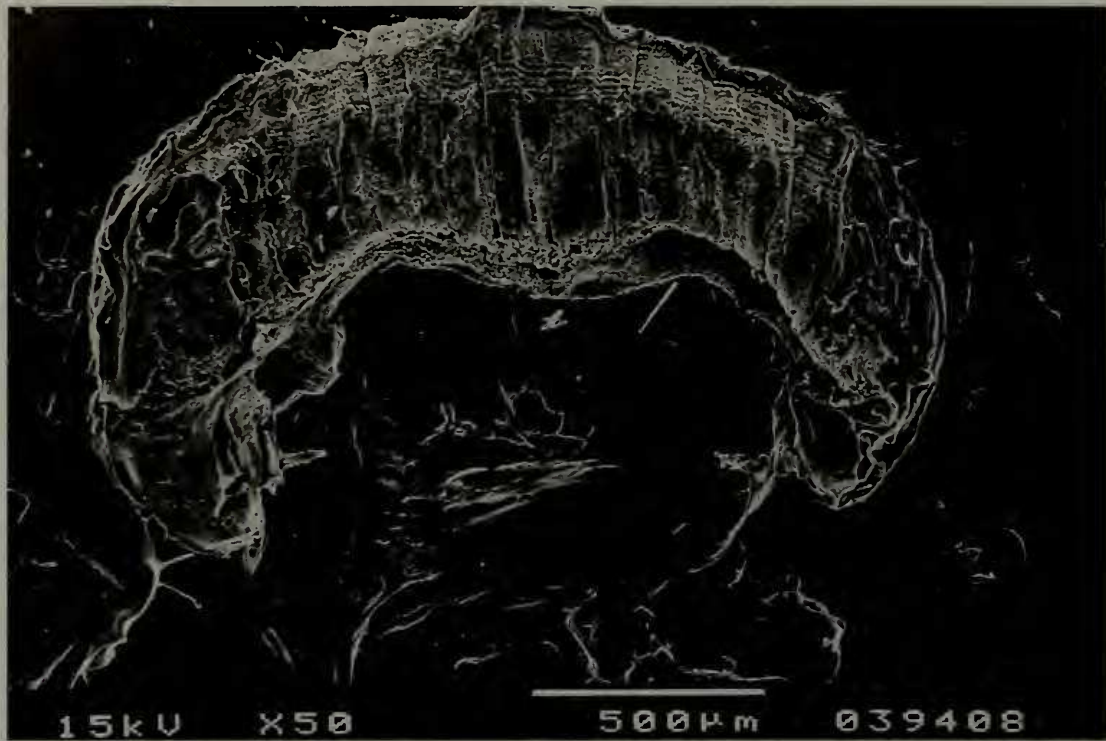
Figs. 1-9. Penis: (1, 1a) *Laevicaulis stuhlmanni*; (2) *L. alte*; (3) *Leidyula floridana*; penial gland; (4) *Laevicaulis stuhlmanni*; (5) *L. alte*; (6) *Leidyula floridana*; pedal gland; (7) *Laevicaulis stuhlmanni*; (8) *L. alte*; (9) *Leidyula floridana*. AC tip of the penis, PE penis, MR retractor muscle, DA anterior deferential duct, PA papilla, TU tubules, OP opening.

13, 14). On 3 radulas examined, there are ca. 94 rows and ca. 95 teeth in each, with an average of about 8,900 teeth (Figs. 15,16). Length, width, and distance from the base to the greatest width for each of 3 rachidian and 3 lateral teeth of the first file on the right was measured (Table 1) and ratios between the means also were calculated (Table 2).

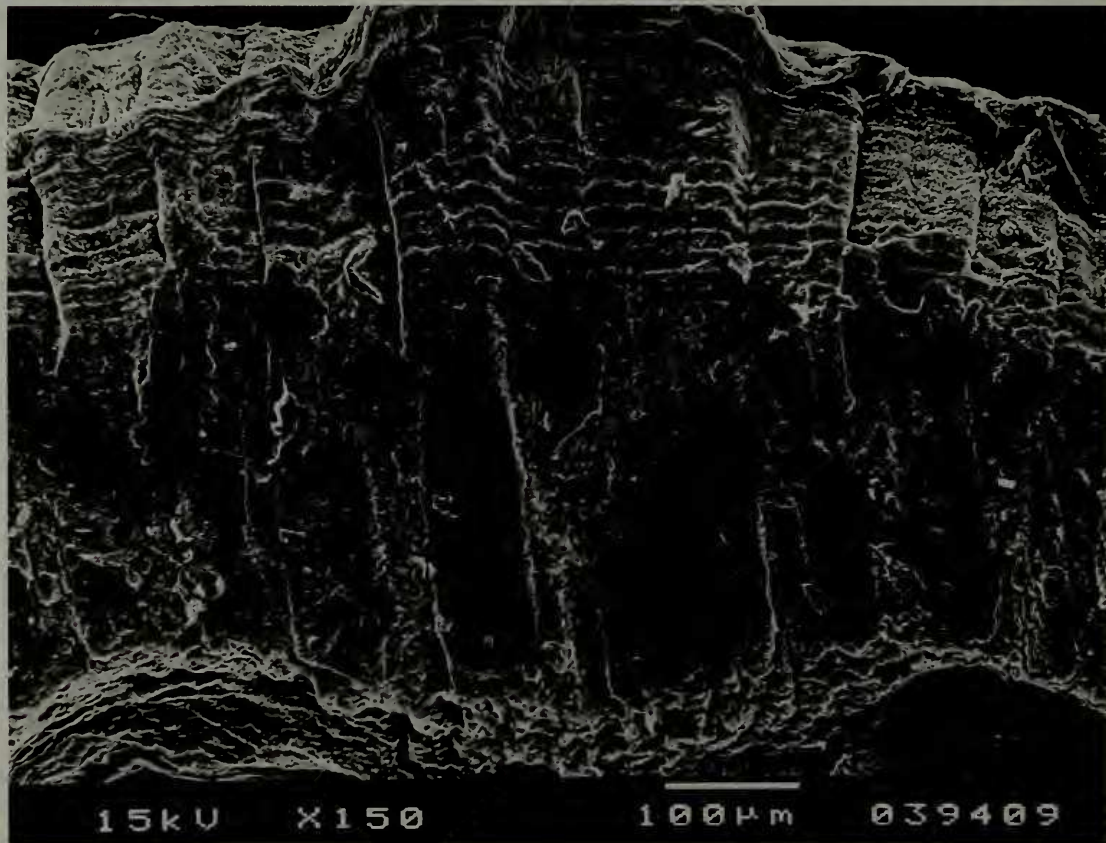
Examined lots.—ANSP A1059 (=154994). U.S.A.: Florida, Lignum Vitae Key; H. A. Pilsbry; 28 Mar 1931; (2 specimens). ANSP A1060. U.S.A.: Florida, St. Petersburg; (2 specimens). ANSP A1061. Cuba: Matanzas Jumari; H. A. Pilsbry; (6 specimens). ANSP A1067. Cuba: Cienfuegos; H. A. Pilsbry; (2 specimens). ANSP A1068 (=197812). Cuba:



Figs. 10-12. Hermaphroditic region: (10) *Laevicaulis stuhlmanni*; (11) *L. alte*; (12) *Leidyula floridana*. AP accessory purse, CP copulation purse, DCP duct of the copulation purse, OV oviduct, RE rectum, DL joining duct, DPD distal posterior deferential duct, DPP proximal posterior duct deferential duct, PR prostate.



13

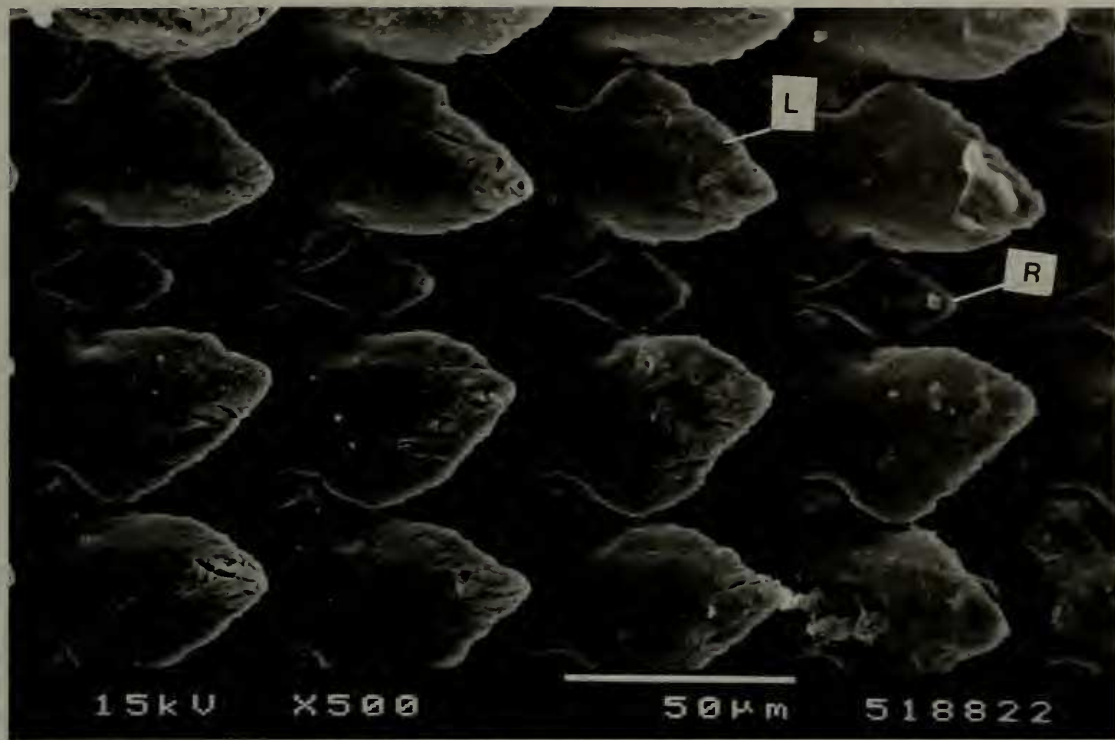


14

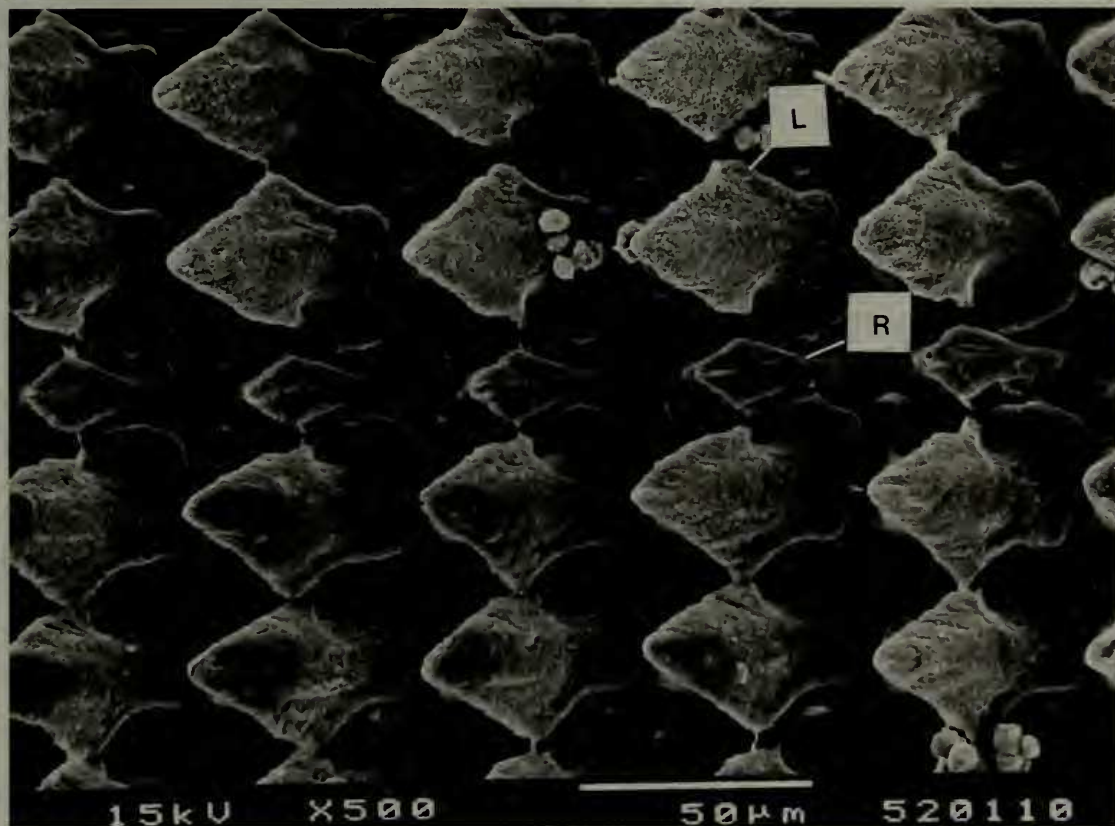
Figs. 13–14. *Leidyula floridana*. (13) jaw 50 \times ; (14) median region of the jaw 150 \times . Paratype USNM 120394.

Cienfuegos; H. A. Pilsbry; (6 miles from Cienfuegos) (9 specimens). ANSP A1069a. Cuba: Zaza del Medio, Prov. Santa Clara; H. A. Pilsbry (2 specimens). ANSP A1071. Cuba: San Juan de Letran; H. A. Pilsbry; (4

specimens). ANSP A1074 (=137807). Cuba: San José, Spiritus; H. A. Pilsbry; (1 specimen). ANSP A1081 (=137803). Cuba: Sancti Spiritus; H. A. Pilsbry; (52 specimens). ANSP A1090 (=63528). U.S.A: Florida, Key



15



16

Figs. 15–16. *Leidyula floridana*. Median region of the radula 500 \times , (15) paratype USNM 805188; median region of the radula 500 \times , (16) paratype 805201. L lateral tooth, R rachidian tooth.

Largo; H. C. Manchette leg; (7 specimens). ANSP A1091. U.S.A: Florida, Miami; H. A. Pilsbry; 1899; (5 specimens). ANSP A1093. Cuba: Marianas; M. C. & S. N. Rhoads leg; 1899; (12 specimens). ANSP A1094 (=85610). U.S.A: Florida, Miami; (10 spec-

imens). ANSP A1096 (=91399). U.S.A: Florida, Mond Key; C. B. More. leg; (1 specimen). ANSP A1101 (=93280). U.S.A: Florida, Sugar Loaf Key; H. A. Pilsbry; 1907; (1 specimen). ANSP A1111. U.S.A: Florida, Dry Tortugas; T. Van Hyning leg; (2 speci-

Table 1.—Length, width and distance of the base to the greatest width for each of 3 first lateral teeth and 3 rachidians of *Leidyula floridana*, in μm .

Lots	Laterals			Rachidians		
	Length	Width	Distance	Length	Width	Distance
1094B	49.28	39.93	34.02	33.32	16.93	19.46
	49.10	41.28	35.24	29.91	17.36	20.67
	54.04	39.81	35.59	30.69	17.12	22.73
Mean	50.80	40.34	34.95	31.30	17.13	20.95
805188	69.93	44.65	45.42	40.77	17.85	26.75
	66.30	46.02	42.22	39.71	17.73	27.24
	68.24	44.38	42.85	39.77	18.08	25.26
Mean	68.15	45.01	43.49	40.08	17.88	26.41
1094 ^A	51.73	41.67	5.71	28.87	22.24	20.75
	49.32	43.14	31.53	29.85	18.59	18.71
	55.08	42.85	34.12	29.06	19.00	19.95
Mean	52.04	42.55	33.78	29.26	19.94	19.80
Overall means	56.99	42.63	37.40	33.54	18.31	22.38

mens). ANSP A1113 (=185244). U.S.A: Florida, St. Petersburg; (1 specimen). ANSP A1119. U.S.A: Florida, Paradise Key, (18 mi W. of Paradise Key - Dade Co. Florida); O. C. Van Hyning leg; 8 Jul 1930; (1 specimen). ANSP A1129 (=156474). U.S.A: Florida, Collier Co.; O. C. Van Hyning leg; 5 Aug 1930; (1 specimen). ANSP A1159. 12 Jul 1933; (1 specimen). ANSP A1163. U.S.A: Florida; 2 Jul 1936; (1 specimen). ANSP A1439. Puerto Rico: Humanaco, Baker; (5 specimens). ANSP A1448. Sierra Movalos; H. B. Baker; (1 specimen). ANSP A8020. U.S.A: Texas, Corpus Christi; G. M. Davis leg; Aug 1979; (Nueces Co., 27°43'N, 97°25'W) (1 specimen). ANSP A9345. U.S.A: Florida, Lignum Vitae Key; Mar 1931; (24°53'N, 80°42'W); (12 specimens). USNM 120394. U.S.A: Florida, H. H. Bunning leg; (3 specimens). USNM 574579. Puerto Rico: Mayaguez; M. Aviles leg; 23 Jun 1941; (8 specimens). USNM 576488. Dominica, at Clarke Hall; P. Spangler leg; (USDA 249592); (2 specimens). USNM 769159. U.S.A: Texas, Brownsville; D. L. Dunagon leg; 27 Mar 1968; (USDA 278478); (2 specimens). USNM 769168. U.S.A: Texas,

Table 2.—Ratios between the averages of the radula teeth of *Leidyula floridana*.

Lots	Q1 = Ll:Rl	Q2 = Lw:Rw	Q3 = Ll:Ld	Q4 = Rl:Rd	Q5 = Ll:Lw	Q6 = Rl:Rw
1094B	1.62	2.35	1.45	1.49	1.25	1.82
805188	1.70	2.51	1.56	1.51	1.51	2.24
1094 ^A	1.77	2.13	1.54	1.47	1.22	1.46
Mean	1.69	2.33	1.51	1.49	1.32	1.84

Ld = lateral distance; Ll = lateral length; Lw = lateral width; Rd = rachidian distance; Rl = rachidian length; Rw = rachidian width.

Raymondville; R. Kloepping leg; 11 Apr 1968; (USDA 278478); (2 specimens). USNM 769195. U.S.A: Texas, Brownsville; O. V. Mullens leg; 2 Feb 1968; (USDA 273170); (4 specimens). USNM 769197. U.S.A: Texas, Brownsville; 2 May 1967; (USDA 266325) (2 specimens). USNM 805188. Cuba: El Guama; 10 Mar 1900; (1 specimen). USNM 805201. U.S.A: Florida, Monroe County, Pinecrest; J. P. E. Morrison leg; 27 Feb 1966; (1 specimen). USNM 805202. U.S.A: Florida, Monroe County; Pinecrest; ; hl mi W; J. P. E. Morrison leg; 27 Feb 1966; (2 specimens).

Leidyula goodfriendi Thomé, 1994

Leidyula goodfriendi Thomé, 1994:169–72.

Occurrence.—Antilles: Jamaica.

Examined lots.—ANSP A1154. 22 Jun 1933; (2 specimens). ANSP A1161. 1 Aug 1933; (1 specimen).

Leidyula kraussi (Férussac 1823 in Férussac & Deshayes, 1820–1851)

Vaginulus kraussii Férussac, 1823:96x in Férussac & Deshayes, 1820–1851.

Leidyula kraussi; Thomé, 1990:513–18; 1993b:70.

Occurrence.—Antilles: Haiti; Jamaica; U.S.A

Examined lots.—ANSP A?? (=62126). Jamaica: Bog Walk; J. Fox leg; 1891; (5 specimens). ANSP A1115. Jamaica: Port Antonio; Wm. J. Fox; 1891; (2 specimens). ANSP A1133 (=85633). Haiti; C. J. Simp-

son leg; (1 specimen). ANSP A1153. 24 Aug 1933; (1 specimen). ANSP A1148 (=62130). Jamaica: Bog Walk; Wm. J. Fox.; 1891; (1 specimen). ANSP A1150. 25 Aug 1933; (3 specimens). ANSP A1152. 26 Jun 1933; (1 specimen). ANSP A1160. 7 Jul 1933; (1 specimen).

Leidyula moreleti (Fischer 1871)

Vaginula moreleti Fischer, 1871:168–69, 175.

Leidyula moreleti; Thomé, 1971:32–4, 1993b:71.

Occurrence.—Colombia; Nicaragua; Honduras; Guatemala; Mexico; U.S.A: Florida; Antilles: Cuba.

Examined lots.—ANSP A1054 (=63941). U.S.A: Florida, Cape Romano; (1 specimen). ANSP A1066. Mexico: Vera Cruz; H. B. Baker; (Custotolapam farm); (43 specimens). ANSP A1107b (=45180). Guatemala; A. A. Hinkley leg; 1914; (4 specimens). ANSP A1110. Cuba: Nueva Gerona, Isle of Pines; G. W. H. Soelnei leg; 18 Jun 1917; (3 specimens). ANSP A1112. Mexico: Mecos; A. A. Hinkley; (1 specimen). ANSP A1117 (=45670). Guatemala: Livingston, A. A. Hinkley; (2 specimens). ANSP A1135 (=45188). Guatemala: Jacola; A. A. Hinkley leg; 12 Feb 1917; (3 specimens). ANSP A1146 (=61309). Mexico: Tabasco; (1 specimen). ANSP A9344. Mexico: Campeche, Peninsula Yucatan; 28 Jul 1932; (18°50'N, 91°20'W); (2 specimens). USNM 120395. Nicaragua: Polvon; W. G. Binney leg; 1890; (1 specimen). USNM 574589. Mexico; 12 Dec 1949; (intercepted at Brownsville, Texas, USDA 185542); (1 specimen). USNM 574940. Colombia; 1945; (on plants, USDA 202348); (1 specimen). USNM 575079. Colombia: Bello; C. Carmona leg; 10 Feb 1956; (on vegetables, USDA 209666); (3 specimens). USNM 575194. Mexico: San Luis Potosi, Tamazunchale; 30 Jul 1957; (intercepted in Laredo, Texas, on orchid plants, USDA 215961); (1 specimen). USNM 576004. Honduras; 27 Sep 1961; (in seed corn, USDA 241044); (7 specimens).

USNM 620158. Mexico: San Luis Potosi, Huichihuayan; (on orchid plants, USDA 212287); (1 specimen). USNM 769137. Mexico; 8 Apr 1967; (intercepted at Brownsville, Texas on orchids, USDA 266325); (1 specimen).

Leidyula portoricensis (Semper 1885)

Vaginula portoricensis Semper 1885:302
Leidyula portoricensis; Thomé 1975b:18;
Thomé & Mansur 1990:534–35.

Occurrence.—Antilles: Puerto Rico, U.S.A.

Examined lots.—ANSP A1439. Porto Rico: Rio Humanaco; H. B. Baker; (2 specimens). ANSP A1442. Porto Rico: Montoro; H. B. Baker; (1 specimen). ANSP A1447. Sa Valuera; H. B. Baker; (2 specimens).

Leidyula trichroma Baker, 1935

Veronicella (Leidyula) kraussii trichroma Backer, 1935:84, 88.

Leidyula trichroma; Thomé, 1988c:32–33.

Occurrence.—Antilles: Jamaica.

Examined lots.—ANSP A1058. Jamaica: Catadupa station, Montego Bay, St. James; H. B. Baker leg; (holotype); ANSP A12218. Same data (paratype).

Phyllocaulis gayi (Fischer 1871)

Vaginula gayi Fischer, 1871:172.

Phyllocaulis gayi; Thomé, 1976:71–5; 1993b:70.

Occurrence.—Chile; (introduced?: Mexico).

Examined lot.—USNM 805195. Chile: Valdivia; E. P. Reed leg; (2 specimens).

Phyllocaulis soleiformis (Orbigny 1835)

Vaginulus soleiformis Orbigny, 1835:2.

Phyllocaulis soleiformis; Thomé, 1976:75–6; 1993b:70.

Occurrence.—Argentina; Uruguay; Brazil: Rio Grande do Sul.

Examined lots.—ANSP A1085 (=69656). Uruguay: Maldonado; W. H. Rush leg; (1 specimen). USNM 576353. Argentina: 30 Km E of Azul; Lord and Jellison leg; May 1962; (USDA 245400); (1 specimen).

Sarasinula dubia (Semper 1885)

Vaginula dubia Semper, 1885:296; Thomé, 1972:252–53.

Sarasinula dubia; Thomé, 1993b:71.

Occurrence.—Brazil: Rio Grande do Sul, São Paulo; Venezuela; Colombia; Honduras; Mexico; U.S.A: Florida, Texas; Antilles: Trinidad and Tobago; Dominica, W.I.; Dominican Republic; Haiti; French Polynesia: Society Islands, Tahiti.

Examined lots.—USNM 769177. U.S.A: Texas, Raymondville; O. V. Mullens leg; 2 Feb 1968; (Willacy Co., Caldwell Nursery, USDA 273170); (3 specimens). USNM 574646. Dominican Republic: Santiago de los Caballeros; J. Jimines leg; 1951; (USDA 190012); (2 specimens). USNM 574676. Trinidad and Tobago: Trinidad, (British W. Indies); 1951; (USDA 191870); (4 specimens). USNM 575465. Haiti; 2 Dec 1958; (intercepted at New York, on *Caladium* plants, USDA 224155); (1 specimen). USNM 575897a. Honduras; 24 Jan 1961; (intercepted at Charleston on bananas, USDA 234701); (2 specimens). USNM 576001. U.S.A: Florida, Miami; 13 Sep 1961; (on the tree *Persea americana*, USDA 239104); (1 specimen). USNM 576337. Honduras: La Lima; 28 Oct 1958; (on a banana plantation, USDA 234081); (8 specimens). USNM 769138. U.S.A: Texas, Brownsville, (on with general nursery plants, USDA 273170); (10 specimens). USNM 769157. U.S.A: Texas, Brownsville; D. L. Dunagan leg; 16 Apr 1968; (Neal Robinson's Nursery, USDA 278478); (7 specimens). USNM 769163. U.S.A: Texas, Raymondville; R. D. Kloepping leg; 11 Apr 1968; (Caldwell Nursery, USDA 278478); (3 specimens). USNM 769177. U.S.A: Texas, Raymondville; O. V. Mullens leg; 2 Feb 1968; (Willacy Co., Caldwell Nursery,

USDA 273170); (3 specimens). USNM 769179. U.S.A: Texas, Brownsville; D. L. Dunagan leg; 26 Mar 1968; (Pan American Nursery, USDA 278478); (2 specimens). USNM 805184. Society Islands: Tahiti; 28 Sep 1899; (2 specimens). USNM 805204. Dominica; Portsmouth; 4 Aug 1929; (E side of watershed); (14 specimens).

Sarasinula linguaeformis (Semper 1885)

Vaginula linguaeformis Semper, 1885:307–08; Thomé, 1973:35–6.

Sarasinula linguaeformis; Thomé, 1993b: 71.

Occurrence.—Brazil: from São Paulo, Minas Gerais to the Northeast, Amazonas; Paraguay; Peru; Guyana.

Examined lots.—ANSP A7021. British Guiana: Georgetown, (6°46'N, 58°10'W); H. Lang; (specimens had been dried out and treated with tri-sodium phosphate, upgraded to 70% ETOH); (2 specimens). USNM 381391. Paraguay; Felippone leg; (4 specimens). USNM 769152. Peru; 17 Jan 1969; (intercepted at Miami on bromeliads, USDA 278478); (1 specimen). USNM 805252. Brazil: Lassance, MG; D. M. Cochran leg; 22 Mar 1935; (Marthyin Corn, USDA 132173); (6 specimens).

Sarasinula plebeia (Fischer 1868)

Vaginulus plebeius Fischer, 1868:145; Thomé, 1971:34–6.

Sarasinula plebeia; Thomé, 1993b:71.

Occurrence.—Chile; Brazil: from Rio Grande do Sul to Paraíba; Venezuela; Colombia; Costa Rica; El Salvador; Honduras; Guatemala; Mexico, U. S. A: Puerto Rico, Florida, Texas; Antilles: St. Lucia; Dominica, W. I.; Virgin Islands; Dominican Republic; Jamaica; Cuba. Also cited to Australia; Asia; Africa.

Examined lots.—ANSP A9346. Venezuela: Carabobo State, Campo Alegre, (4 miles east of Caracas); (00021548, 10°35'N, 66°52'W, EDP, 21548); (26 specimens). USNM 574451. Venezuela: Sucre,

Cariaco; G. Marcuzzi leg; Sep 1948; (USDA 180965); (3 specimens). USNM 574834. Virgin Islands: Saint Thomas; 1952; (USDA 195560); (2 specimens). USNM 574838. Virgin Islands: Saint John; 4 Aug 1952; (USDA 195744); (8 specimens). USNM 574942. Dominican Republic; 7 Jan 1954; (USDA 201313); (1 specimen). USNM 575265. Costa Rica; 2 Oct 1957; (USDA 216763); (1 specimen). USNM 575366. Venezuela: Anzoátequi, San Tome; T. Briceno leg; (USDA 216763); (1 specimen). USNM 576341. Costa Rica; 1960; (USDA 231087); (1 specimen). USNM 578214. Costa Rica: Golfito; M. Kosztarali leg; 21 Feb 1970; (USDA 295099); (1 specimen). USNM 768944. Nicaragua; 10 Nov 1969; (intercepted at Miami on bromeliads, USDA 283854); (1 specimen). USNM 768945. El Salvador: Santa Tecla; 3 Jun 1969; (intercepted at Miami on weeds, USDA 283854); (4 specimens). USNM 768946. Mexico; V. C. Fort leg; 23 Oct 1969; (intercepted at Fort Laredo, Texas, on orchids); (2 specimens). USNM 769135. El Salvador; 8 Jan 1968; (intercepted at New Orleans on orchids, USDA 273170); (1 specimen). USNM 769143. Puerto Rico: Bayamon; 16 Sep 1966; (intercepted at San Juan on Saint Augustine grass, USDA 266325); (1 specimen). USNM 769156. Puerto Rico: Cupey Alto; 23 Oct 1968; (intercepted at San Juan on *Dossaena* leaf, USDA 278478); (1 specimen). USNM 769186. U.S.A.: Texas; W. J. Bone leg; 8 Feb 1968; (McAllen, Hidalgo Co., Waugh Nursery, USDA 273170); (1 specimen). USNM 805203. Honduras; H. E. Ostmark and C. Evers leg; 13 Aug 1962; (on bananas, USDA 243607); (5 specimens). USNM 805204. Dominica: Portsmouth; 4 Aug 1929; (E side of watershed); (14 specimens). USNM 805235. Unknown (St. Lucia?); 10 Aug 1929; (1 specimen).

Simrothula columbiana (Simroth 1914)

Vaginula columbiana Simroth, 1914:300–03; Thomé, 1970a:76–8; 1979:144–45.

Simrothula columbiana; Thomé, 1993b:72.

Occurrence.—Colombia.

Examined lot.—ANSP A1441. (?) Cabo Rojo, (R33, Cabo Rojo); H. B. Baker; (1 specimen).

Simrothula prismatica (Simroth 1914)

Vaginula prismatica Simroth, 1914:314–16; Thomé, 1972:261–63.

Simrothula prismatica; Thomé, 1993b:72.

Occurrence.—Colombia.

Examined lot.—USNM 575078. Colombia: Bello. C. Carmona; 10 Feb 1956; (USDA 209666); (2 specimens).

Vaginulus taunaisii Férussac, 1821

Vaginulus taunaisii Férussac, 1821:13.

Vaginulus taunayi; Thomé, 1971:36–9; 1993b:72.

Occurrence.—Brazil: Rio de Janeiro.

Examined lot.—USNM 805194. Brazil: Rio de Janeiro, Niemeyer Avenue; 7 Feb 1935; (1 specimen).

Veronicella bahamensis Dall, 1905

Veronicella schivelyae bahamensis Dall, 1905:446.

Veronicella bahamensis; Thomé & Lopes-Pitoni, 1976:712–13; Thomé, 1993b:72.

Occurrence.—Bahamas.

Examined lot.—USNM 180415. Bahamas: Little Abaco; O. Bryant leg; (lectotype); USNM 180738. Bahamas: Nassau, Johnson Place; O. Bryant leg; 6 Jul 1904; (3 specimens).

Veronicella cubensis (Pfeiffer 1840)

Onchidium cubense Pfeiffer, 1840:250.

Veronicella cubensis; Thomé, 1993a:113–21; 1993b:70

Occurrence.—Antilles: Dominica, W.I.; Dominican Republic; Haiti; Cuba; Bahamas; U.S.A. Puerto Rico, Louisiana, Hawaii.

Examined lots.—ANSP A1083. Cuba: Havana, La Salud; H. A. Pilsbry; 1904; (5 specimens). ANSP A1443. Araciba river; H. B. Baker; (4 specimens). ANSP A1446. Catano; H. B. Baker; (1 specimen). ANSP A1741. Cuba: Punto Angre; (2 specimens). USNM 575898. Bahamas: Andros Island; 11 Feb 1961; (intercepted at Port Everglades, on bananas plantation); (1 specimen). USNM 576360. Puerto Rico; 17 Oct 1962; (on plants); (1 specimen). USNM 709075. Dominica; T. M. Clarke and J. F. G. leg; 13 Jan 1965; (at Clarke Hall); (1 specimen). USNM 769160. U.S.A: Louisiana, New Orleans; 29 Jun 1970; (on sidewalk near Tuoro Hospital); (1 specimen). USNM 805193. Haiti: Furcy; A. Curtiss; 20 Jun 1944; (with eggs); (1 specimen).

Veronicella davisi Thomé, Santos & Pedott, 1996

Veronicella davisi Thomé, Santos & Pedott, 1996:265–74.

Occurrence.—Antilles: Jamaica; Cuba.

Examined lots.—ANSP A1065a. Cuba: Majagua; H. A. Pilsbry (Holotype); ANSP A1065. Same data; (6 specimens) (Paratypes); ANSP A1069. Cuba: Prov. Santa Clara, Zaza del Medio; H. A. Pilsbry; (6 specimens). ANSP A1072. Jamaica; J. B. Henderson; (1 specimen). ANSP A1073 (=137804). Cuba: Trinidad; H. A. Pilsbry; (5 specimens). ANSP A1075. Cuba, 15 Km South of Sancti Spiritus; H. A. Pilsbry; (2 specimens). ANSP A1077. (=137806). Cuba: Trinidad; H. A. Pilsbry; (1 specimen). ANSP A1155. J. 5. Som.; 22 Jun 1933; (1 specimen). ANSP A1156. 20 Jul 1933; (1 specimen). ANSP A1157. 7 Jul 1933; (1 specimen). ANSP A1158. 22 Jun 1933; (1 specimen). ANSP A1748. J. 5. Som.; 22 Jun 1933; (2 specimens).

Veronicella sloanei (Cuvier 1817)

Onchidium sloanei Cuvier, 1817:411.

Veronicella sloanei; Thomé, 1988a:13–35; 1993b:70.

Occurrence.—Colombia: Isla de Providencia; Nicaragua; Bermudas; Bahamas; (U.S.A: Massachusetts—introduced?); Antilles: Barbados; Jamaica; Cayman Islands.

Examined lots.—ANSP A1070. Grand Cayman; 17 Apr 1929; (Sta 4; Pinchat Exped); (2 specimens). ANSP A1078. Isabel, Old Providence Id; 1929; (Pine Hot Exped); (1 specimen). ANSP A1104 (=57956). Nicaragua: Machuca; Dr. J. F. Bransford; (1 specimen). ANSP A1108. Bermuda: Frascati Hotel; A. Gulick; (3 specimens). ANSP A1109. Jamaica: Kingston Bath; T. D. A. Cockerell; (7 specimens). ANSP A1114. Jamaica: Kingston; T. D. A. Cockerell; May 1892; (1 specimen). ANSP A1118. Jamaica: Kingston; T. D. A. Cockerell; (1 specimen). ANSP A1120. Grand Cayman; 1929; (Pinchat Exped); (1 specimen). ANSP A1124. Jamaica: Kingston; T. D. A. Cockerell; (2 specimens). ANSP A1125. Jamaica: Kingston; T. D. A. Cockerell; (1 specimen). ANSP A1126. Jamaica: Kingston; T. D. A. Cockerell; (1 specimen). ANSP A1130 (=98631). Bermuda: near Harrington House; S. Brown; Jun 1909; (1 specimen). ANSP A1144 (=65396). Jamaica; J. B. Henderson Jr.; (2 specimens). ANSP A1145. Jamaica: Port Antonio; W. J. Fox; 1891; (4 specimens). ANSP A1149 (=69360). Nantucket (introduced ?); Dr. B. Sharp; Aug 1896; (on bananas); (1 specimen). ANSP A1437 (=60964). Bermudas: St. George; Heilprind Expedition leg; 1888. (Holotype of *Vaginulus schivelyae* Pilsbry, 1890). ANSP A1452. H. B. Baker; 5 Sep 1933; (3 specimens). ANSP A1455. H. B. Baker; 5 Jul 1933; (1 specimen). ANSP A1747. J. 33 .H.; 20 Aug 1933; (15 specimens). ANSP A1748. Bahamas; Mich. Goodrich; 21 Aug 1933; (1 specimen). USNM 574916. Jamaica; (British West Indies); 24 Jul 1953; (intercepted at Miami, Florida, on orchids, USDA 199469); (1 specimen). USNM 791486. Jamaica; (1 specimen). USNM 805186. Jamaica: Kingston; C. R. Orcutt leg; 29 Aug 1927; (2 specimens). USNM 805190. Jamaica: Saint Thomas, Antully Parish; C. R. Orcutt

leg; Aug 1927; (3 specimens). USNM 805192. Jamaica: Antully; C. R. Orcutt leg; (10 specimens).

Veronicella tenax Baker, 1931

Veronicella (Tenacipes) tenax Baker, 1931: 131–34.

Veronicella tenax; Thomé, 1988c:30–2; 1993b:72.

Occurrence.—Antilles: Antigua and Barbuda; Cuba.

Examined lot.—ANSP A12221 (=291340a). Cuba: Enseñada de San Vicente, Cueva de Tiburón, Pinar del Rio; H. P. Pilsbry leg; 1928; (Holotype). ANSP A12222 (=291340b). same data; (2 specimens); (Paratypes). ANSP A1164. Antigua; A. P. Brown; (5 specimens).

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Appendix

On the spelling and date of *Vaginulus taunaisii* Férussac, 1821 (Veronicellidae; Soleolifera; Gastropoda; Mollusca).—A number of differences continue to exist among malacologists regarding the spelling and date of the name proposed more than a century ago by the Frenchmen, d'Audebard de Férussac (father and son). Even now, through correspondence, an argument on the subject has been put forth by a well-known colleague. I do not pretend to have found the full solution, but I hope to contribute to clarification of the controversy with a view to achieving a consensus.

The generic name *Vaginulus* was proposed by Férussac in 1821 (p. 6,9,13). In my opinion it is a valid name, with correct, latinized, original spelling, although use of the masculine suffix (from the Latin: *vagina* + *ulus, ula, ulum* = diminutive) (Jaeger 1978: 275) may be considered unsuitable, but not wrong. The spelling is in conformity with the International Code of Zoological Nomenclature (ICZN) 1985, art. 11(b)(i), 32 (c)(ii), table 2 on P. 207.

To replace *Vaginulus*, the generic name *Vaginula* was proposed by Berthold, 1827, according to Neave (1940:625). Fischer (1871:148) also suggested changing it due to error (faufit) and among others, Deshayes (1930) himself, in Férussac & Deshayes 1820-1851: 96⁶ and even Hoffman (1925:172) insisted on the substitution, without justifying their position. Nevertheless, it should be considered an unjustified emendation (ICZN 1985, art. 33 (b) (iii) and, therefore, *Vaginula* Berthold, 1827 (non *Vaginula* Sowerby, 1820 (Hoffmann, 1925:172); *Vaginula* Risso, 1826 (Neave 1940: 625) must be considered a junior objective synonym.

The specific name *taunaisii* (Férussac 1821:13, and Férussac 1821 and 1823, in Férussac & Deshayes 1820–1851, pl. 8A, fig. 7, pl. 8B, fig. 1–2, and p. 96^a) is said to be an homage to the Frenchman, Taunay (son), whose modern patronym appears to have been erroneously latinized. Fischer (1871:170) and Hoffman (1925:173), among others, have already proposed the correct spelling as *taunayi* (ICZN 1985, art. 11, (h) (i)

(3), 31 (a) (i) and (ii)). The original species name, *taunaisii*, has been used by very few authors, the most recent of these being Martens (1867). In spite of this, taking into consideration the opinions of editors and consultants, and based on art. 32 (c) (ii) of the ICZN (1985), I propose a return to the original spelling of the specific name, with the specific name *taunayi* becoming an "incorrect subsequent spelling" (art. 33 (c) ICZN 1985).

Regarding the date of the confusing publication of the Férussacs, the most solid work of dating by external evidence must be that of Kennard (1942a, 1942b), who accepts the date of 17 July 1822 for the pages containing the original description of *Vaginulus* and *V. taunaisii*. Nevertheless, the date on the cover of the Férussac work is January 1821 (janvier 1821) and in the second edition of the great work of Férussac & Deshayes (1820–1851), page 96¹ (edited by Deshayes

in 1830) is it expressly stated that the disputed work of Férussac was published in June of 1821 (juin 1821), and therefore distributed with six months delay, but not more than a year and a half, as Kennard figured. Also Herrmannsen (1849), Fischer (1871), and Hoffmann (1925), among others, mention the date of 1821 as valid for the taxa in question, which also appears to me to be valid external evidence.

The species *Vaginulus taunaisii* (= *taunayi*) Férussac, 1821 has been well redescribed (Thomé 1971:36–39, 41, fig. 15–17, 22), and the genus recharacterized (Thomé 1975b:7–9, 28–32), which should now be considered monotypic. Thus the argument has little significance for the stability and universality of the taxa, for there are no taxonomic implications for their determination and classification. This is also true with reference to the maintenance of the family name, which should be Veronicellidae, as has been demonstrated by Thomé (1979:138–141).