

A new rabbit species (*Sylvilagus*, Mammalia: Leporidae) from the lowlands of Venezuela

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Abstract: A new species of Venezuelan rabbit of the genus *Sylvilagus* from Fundo Millano (08° 46'N and 69° 56'W) and Chorroscoco Bajo (08° 05'N and 69° 18'W), between 190 and 120 masl, state of Barinas, is described based on: 1. Body and skull measurements. 2. Coloration patterns of the pelage. 3. Arrangement and length of the color hair bands of dorsal, lateral, ventral nuchal, and gular patches. Body and cranial measurements, and some color patterns of the new species, *Sylvilagus varynaensis*, were compared with those of the closest relative groups such as *S. brasiliensis* (from Venezuela and Brazil), *S. b. meridensis* from the Venezuelan paramos, and three of the most representative groups of *S. floridanus* (*S. f. continentis*, *S. f. orinoci*, and *S. f. valenciae*). Most of the values recorded for these parameters were significantly higher for the new species ($P < 0.005$; Student "t" test). Cluster and principal components analysis of the data recorded for cranial characteristics indicated that *S. varynaensis* is the largest and darkest of the known Venezuelan rabbits, with a broader elongated skull and a different arrangement of the color hair bands.

Key words: Neotropics, Venezuela, rabbits, new species, *Sylvilagus* skull measurements, cluster analysis.

Speciation and subspeciation is high among the new world members of the genus *Sylvilagus*. Nine subspecies of *Sylvilagus floridanus* Allen, 1890, and 22 subspecies of *S. brasiliensis* Linnaeus, 1758, have been recognized in South America. Of these, the least well known is the latter species. Its first description was done on one specimen from Pernambuco, Brazil (Hershkovitz 1950).

Three pairs of teats (pectoral, abdominal, and inguinal), a button-shaped and uniformly colored tail, and reddish coloration on the dorsal region of the body were given by Hershkovitz (1950) as specific characteristics of *S. brasiliensis*. By comparison, the cottontail rabbit (*S. floridanus*) is characterized by having four pairs of teats: pectoral (1), abdominal (2), and

inguinal (1); a longer and bicolored tail (dorsal reddish-brown and ventral cotton-white), and reddish-brown to gray of dorsal body region.

Three subspecies of *S. brasiliensis* and five subspecies of *S. floridanus* have been described from Venezuela. Differences among these groups are based primary on color patterns and geographic distribution (Hershkovitz 1950, Durant and Pérez 1989). The most thoroughly characterized are *S. b. meridensis* Thomas, 1904 (Durant 1988), and *S. f. continentis* Osgood, 1912 (Ojeda and Keith 1982, Ochoa *et al.* 1987, Durant and Pérez 1995). To extend our knowledge of these animals, an ecological study of some populations of Venezuelan rabbits was carried out between 1989 and 1990 in two areas of Barinas state. Several

specimens of an apparently new species of rabbit were taken from these areas. Additional rabbits of the same type also were captured in the neighboring states of Portuguesa and Guárico. All individuals had three pairs of teats, a short tail of an almost uniform coloration, as in *S. brasiliensis*; however, they had different patterns of hair color bands on the body. The greatest differences from the other rabbit groups, however, were the body and cranial sizes, which are the largest among the Venezuelan rabbits. Based on these considerations, the above mentioned specimens are used to describe a new species of rabbit.

MATERIALS AND METHODS

Selection of holotype and paratypes

A specimen was selected at random from 45 adult rabbits collected in the study area. This specimen was a female with catalogue number I-5778 of the Colección de Vertebrados de la Universidad de Los Andes (CVULA), Mérida, Venezuela.

Five female skins and skulls (I-5783, I-5784, I-5786, I-5787, I-5788) and five males (I-5779, I-5780, I-5781, I-5782, I-5785) from the collecting areas were also chosen at random, and labelled as paratypes. All them were a very well made skin and skull specimens. Body measurements were taken from the specimen tag, and 35 quantitative cranial measurements (Appendix 1) were recorded to the nearest 0.1 mm using a calipers (Diersing and Wilson 1980, Pilleri and Pilleri 1984, Wilkins 1985). Sample size for cranial characteristics of the new species include: 22 adult females and 23 adult males from "Fundo Millano" (type locality) and "Chorrosco Bajo", Barinas. Similar body and skull measurements were taken for *S. brasiliensis* (N = 66), from Brazil (identified as *S. b. B.*), Museo Nacional de Rio de Janeiro (MNRJ), and from Venezuela, *S. brasiliensis* (N = 36), named *S. b. V.* Colección de Mamíferos de la Estación Biológica de Rancho

Grande (EBRG), Maracay, Aragua; *S. b. meridensis* (N = 42), and *S. f. continentis* Osgood, 1912 (N = 40), from CVULA; *S. f. orinoci* Thomas, 1900 (N = 27), and *S. f. valenciae* Thomas, 1914 (N = 86), from EBRG.

Hair description was strengthened by measurements of hair color bands from a sample of 30 hairs from the following body regions: dorsal, lateral, ventral, nuchal, and gular patches and ventral and dorsal side of the tail. Measurements were taken at the distal section of each hair and are referred to as the length (mm) of the black (B), dark-red (DR), light red (LR), and light-cream (LC) bands. Length of hair color bands was measured on one specimen from each group named above, and one specimen of *S. floridanus* from Texas, USA. Distribution and length differences of the hair color bands made up the main coloration patterns in these rabbit groups (Durant 1982). Standard deviation, Student test, variance, and correlation analysis (Sokal & Rohlf 1969), were applied to assay the levels of association, differences, and significance variations. Principal component analysis (PCA) of the skull measurements was performed to assess the correlation among variables and components in the groups being compared. Principal components techniques were carried out using the French Statistical Package Statief (FSPS), and correlation matrix. Cluster analysis, Euclidean distance, and one way analysis of variance were run with the FSPS.

Sylvilagus varynaensis, new species

Holotype: Adult female number I-5778, collected by Pedro Durant and Manuel A. Guevara, 17 August 1989.

Type locality: "Fundo Millano" (08° 46'N and 69° 56'W), el. 146 m, 18 km NE of the town of Sabaneta, Distrito Obispos, Barinas, Venezuela (Fig. 1).

Distribution: "Chorrosco Bajo" (08° 05'N and 69° 18'W), el. 82 m, 112 km E from the type locality, and 28 km EN of Ciudad de Nutrias, on the Sabaneta road - Ciudad de Nutrias, Barinas. "Hato Cantaclaro",

15 km N of the town of Santa Rosa (08° 26'N and 69° 41'W), el. 110 m, on the Sabaneta road - Ciudad de Nutrias (Fig. 1). "Hacienda Las Mercedes", 1-180 m, 25 km W of the City of Guanare, at the Guanare - Guana-

rito road, Portuguesa. "Finca Las Lajitas", el. 240 m, 4- 5 km NW of the town of San Rafael de Orituco, Distrito Monagas, on the San Juan de los Morros road - Altigracia de Orituco, Guárico.

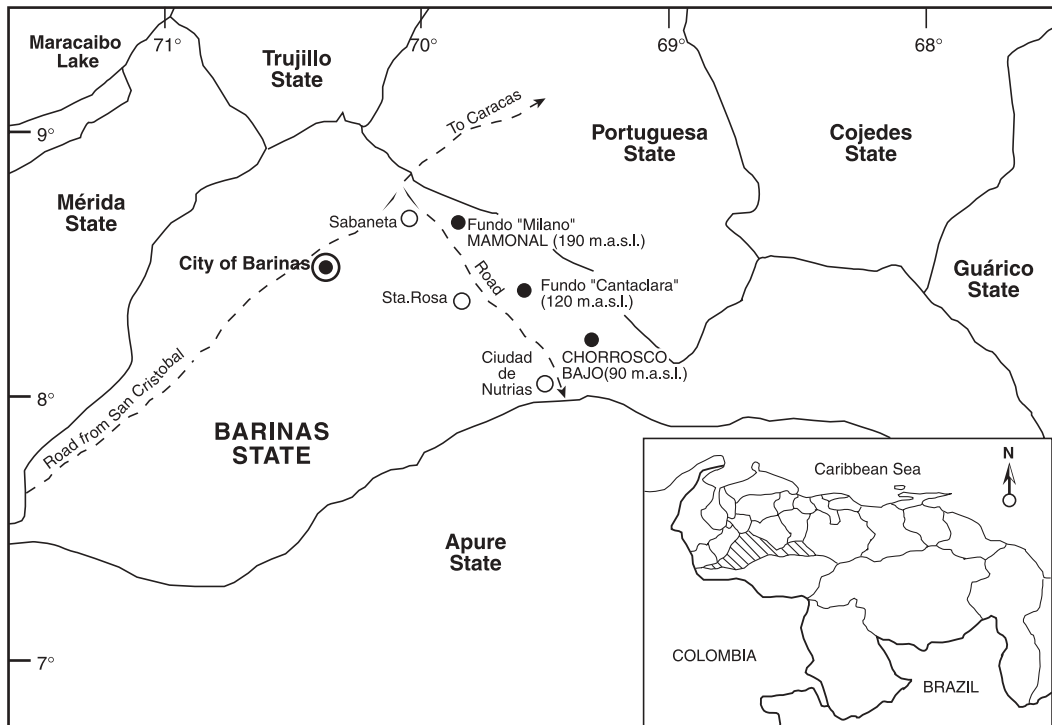


Fig. 1. Localization of the collecting areas in the state of Barinas. Venezuela.

Characteristics of the new species: Weight and body size of the holotype and paratypes are shown in Table 1. There was sexual dimorphism in these two body measurements, as has been recorded for other groups of rabbits (Durant and Pérez 1989). Significant differences ($P < 0.005$; "t" test) also were found in the majority of the morphometric data recorded between the new species and the other six groups of rabbits. Data from Tables 2 and 3 show that the species being described is neither *S. brasiliensis*, because of the larger body measurements, nor *S. floridanus* due to the significant difference in tail length ($P < 0.001$; "t" test), unicolor tail, and three pairs of teats instead of four in females.

Twenty five of the 35 skull measurements were significantly different between *S. varynaensis* and the other groups of rabbits ($P < 0.005$). The sixteen major length and breadth measurements (GSL to POB) of the new species (Table 4), also were significantly different from those of *S. f. valenciae*, which was previously considered as the largest rabbit of the Neotropics. However, the palatal length of *S. f. valenciae* ($PL = 40.02 \pm 4.76$ mm) is the only cranial feature significantly larger than that of *S. varynaensis* ($PL = 35.67 \pm 5.43$ mm). Similarly, POB of *S. b. meridensis* had the highest value (10.60 ± 1.03 mm) of all rabbits considered (Table 4). These differences are shown in

TABLE 1

Morphological and cranial (mm) measurements of holotype (1) and paratypes of S. varynaensis n. sp. Values in groups 2 (females) and 3 (males), are means and one standard deviation of five specimens of each sex. Groups 4 and 5 represent one adult female and one adult male from the Hacienda "Las Mercedes", Portuguesa. Venezuela

I.D.	BS	BW	HFL	EL	TL	GSL	BL	BB	MTR	MTL	UDL	LDL	ZB
1	435	1890	89.0	59.0	28.0	79.2	71.2	28.2	25.7	14.5	14.8	22.4	38.0
2	440 14.6	1969 87.7	87.2 0.98	59.4 1.02	26.0 1.67	78.7 3.02	72.6 2.67	27.3 0.69	29.2 2.66	14.9 0.54	14.9 1.19	23.7 0.93	38.5 1.50
3	434 14.0	1693 109.4	88.6 2.24	61.2 2.32	28.2 3.25	79.7 2.12	72.8 3.43	27.2 1.18	28.6 1.85	15.3 0.59	14.9 0.90	22.6 1.33	38.6 0.52
4	440	1995	90.0	64.0	26.0	82.4	75.7	27.4	31.7	16.3	17.5	23.5	37.5
5	430	1884	86.0	62.5	25.0	79.0	72.8	25.2	28.3	14.8	14.3	22.6	37.0

BS: Body size; BW: Body weight; HFL: Hind foot length; EL: Ear length; TL: Tail length. GSL: Greatest skull length; BL: basal length; BB: braincase breadth; MTR: maxillary toothrow length; MTL: mandibular toothrow length; UPL: upper diastema length. LDL: lower diastema length. ZB Zygomatic arch.

TABLE 2

Body measurements in S. varynaensis n. sp. compared with those of other groups of Sylvilagus. \pm standard deviation

Rabbit species	Nº	Sex	BW (g)	BS (mm)	HFL (mm)	EL (mm)	TL (mm)
<i>S. varynaensis</i> n. sp.	22	F	1739 \pm 41	434 \pm 15.0	86 \pm 2.8	60 \pm 1.7	23 \pm 2.3
	23	M	1602 \pm 69	425 \pm 9.0	86 \pm 2.4	61 \pm 1.2	24 \pm 2.6
<i>S. b. brasiliensis</i> B	47	F	972 \pm 14	376 \pm 12.0	79 \pm 3.1	59 \pm 3.3	19 \pm 2.2
	19	M	815 \pm 63	350 \pm 16.0	77 \pm 2.7	58 \pm 2.3	18 \pm 2.2
<i>S. b. brasiliensis</i> V	13	F	1180 \pm 31	388 \pm 3.3	79 \pm 0.8	54 \pm 1.1	20.3 \pm 1.2
	23	M	1010 \pm 34	378 \pm 4.0	76 \pm 0.7	50 \pm 0.5	20.8 \pm 1.8
<i>S. b. meridensis</i>	20	F	884 \pm 41	362 \pm 7.3	79 \pm 1.5	58 \pm 2.0	21 \pm 2.2
	22	M	778 \pm 62	343 \pm 11.0	77 \pm 3.3	56 \pm 3.8	19 \pm 1.3
<i>S. f. continentis</i>	18	F	1233 \pm 52	395 \pm 23.0	81 \pm 2.6	80 \pm 3.8	38 \pm 3.3
	22	M	1115 \pm 42	375 \pm 14.0	81 \pm 1.6	79 \pm 2.2	37 \pm 3.1
<i>S. f. orinoci</i>	16	F	1181 \pm 29	407 \pm 12.0	89 \pm 3.8	57 \pm 2.4	38 \pm 2.5
	11	M	1197 \pm 91	404 \pm 8.0	84 \pm 3.5	57 \pm 3.6	36 \pm 3.1
<i>S. f. valenciae</i>	40	F	1710 \pm 42	452 \pm 17.0	91 \pm 4.2	61 \pm 2.4	35 \pm 3.6
	46	M	1469 \pm 38	434 \pm 19.0	91 \pm 3.4	60 \pm 2.6	34 \pm 3.8

BW: body length; BS: body size; HFL: hind foot length; EL: ear length; TL: tail length.

B: sample of *S. brasiliensis*. V: sample of *S. brasiliensis* from Venezuela.

TABLE 3

Differences ("t" test) between body measurements of *S. varynaensis* n. sp. and other groups of rabbits

Body measurements	BW		BS		HFL		EL		TL		df
	t	P	t	P	T	P	t	P	t	P	
<i>S. brasiliensis</i> B	14.3	+++	11.2	+++	9.86	+++	7.99	+++	13.11	+++	65
<i>S. brasiliensis</i> V	17.2	+++	12.6	+++	5.78	+++	36.7	+++	7.77	+++	35
<i>S. b. meridensis</i>	11.2	+++	9.51	+++	6.00	+++	14.5	+++	8.02	+++	41
<i>S. f. continensis</i>	9.10	+++	8.16	+++	5.97	+++	33.9	+++	32.9	+++	39
<i>S. f. orinoci</i>	11.3	+++	4.37	+++	0.29	ns	8.49	+++	24.2	+++	26
<i>S. f. valenciae</i>	1.57	+	1.20	Ns	2.39	++	0.0	ns	75.8	+++	86

B: specimens from Museo Nacional de Rio de Janeiro (Brazil). V: specimens from Estación Biológica de Rancho Grande (Venezuela); ns: not significant; +: $P < 0.05$; ++: $P < 0.005$; +++: $P < 0.001$. For other symbols, see Table 2.

Fig. 2 for the greatest skull length (GSL), condylobasal length (CBL), condylobasilar length (cbl), and basilar skull length (BSL). In this Fig. *S. varynaensis* is also recognized as a different group of rabbits.

A data matrix composed of 342 rabbits from six Venezuelan populations, and one species from Brazil (*S. b. B*), was used for principal components and cluster analysis. The PCA synthesized the information contained in the 35 skull variables in a two dimensional space. The first two components accounted for 46.7% of the total variation present in the original variables. The first component explained 39.2 % and the second one 7.5 % of the variances.

Twenty one variables (Fig. 3) characterized the first component by their strong correlation. In relation to the second component, a clear opposition between the variables POB, and bulla breadth (Fig. 3) was observed.

Graphic analysis of the seven populations in the plane of the two first components characterized the populations in function of the Euclidian distance between them. The populations from the páramo (*S. b. meridensis*) and from Barinas (*S. varynaensis*) are located at the right (*S. b. m*) and at the left (*S. v.*) of second component (Fig. 4), separated by the first component, with little overlap between populations. The centroids are also located in the

middle of each group. On the contrary the rest of the populations, except *S. f. valenciae* (*S. f. v.*), are opposite located with no clear delimitation among them (Fig. 4).

Cluster analysis (Fig. 5) showed three main groups of rabbits. In the first one the new species (*S. v.*) appears to be more closely related to *S. f. valenciae* (*S. f. v.*), than to the other groups. These groups are in turn associated with two other *S. floridanus* subspecies (*S. f. c.* and *S. f. o.*), and the three subspecies of *S. brasiliensis* (*S. b. B*, *S. b. V*, and *S. b. m.*). Thus, principal components and cluster analysis also reinforce the evidence that *S. varynaensis* is a new species of rabbit.

Coloration of the Holotype (following Hershkovitz 1950, Diersing and Wilson 1980): Tip of the nose tawny. Rostrum tawny-cinnamon, densely mixed with black at the frontal region. Outer border of nares white. Cheek and supraorbital region buffy, slightly bordered with black at the postero-ventral side. Orbital ring cotton-white. Outer surface of the ear light buffy. Hairs of the nuchal patch reddish and cylindrical. Length of the distal section (Table 5, Fig. 6) of these hairs was 10.7 ± 0.98 mm ($N=30$). Proximal sections shorter and reddish.

Body dorsal surface intensely buffy, bordered with black. Length of the distal and

TABLE 4

Sample size, average, standard deviation, variance (F) and Levene Test, for Homogeneity of Variances (LTH) in 21 of the 35 skull characteristics recorded in the rabbit groups (1 to 7). $P \leq 0.05$ (F)

Skull	Rabbit groups and sample size							F	LTH
	<i>S. v.</i>	<i>S. b. B</i>	<i>S. b. V</i>	<i>S. b. m.</i>	<i>S. f. c.</i>	<i>S. f. o.</i>	<i>S. f. v.</i>		
Characts.	45	66	36	42	40	27	86		
GSL	80.17 2.5	69.92 2.30	65.49 13.23	69.47 5.27	71.47 2.05	73.46 2.14	77.76 4.62	47.8	.116
BL	65.46 2.5	58.19 2.13	56.25 1.57	57.36 2.45	57.61 1.94	59.21 2.62	63.19 2.58	61.2	.733
CBR	68.27 7.96	58.92 2.17	58.06 1.53	63.67 2.57	59.46 1.87	61.17 3.32	66.03 1.76	61.0	.108
CBL	61.48 2.24	54.73 2.02	53.91 1.68	55.50 3.02	54.63 2.07	56.82 1.95	60.67 2.14	112.5	.141
cbl	65.71 3.16	55.54 6.41	55.61 1.67	61.95 2.38	56.13 1.85	58.28 2.40	62.31 4.40	56.0	.468
PL*	35.67 5.43	30.35 1.51	33.49 1.64	32.01 6.13	35.84 4.83	37.12 1.53	40.02 4.76	41.4	.195
pl	8.09 .75	6.48 .64	6.33 .63	7.02 .91	5.95 .60	7.11 .57	7.90 .55	77.8	.839
mn1	27.57 2.87	20.43 2.14	21.49 1.30	21.91 1.77	23.82 1.70	25.67 2.24	26.73 2.16	98.4	.156
MNB	16.21 1.30	14.44 2.56	13.25 1.48	13.29 1.04	14.84 2.05	14.77 1.23	15.34 1.39	19.3	.769
MB*	4.08 .24	3.93 .33	4.03 .50	3.96 .38	3.96 .48	4.24 .36	4.37 .32	62.2	.97
mt1	16.71 1.14	14.64 .65	14.37 .81	14.22 .90	14.17 .87	14.61 1.65	15.77 .59	28.6	.106
LDL	20.54 1.68	17.26 1.21	17.32 1.40	17.33 1.49	17.10 1.28	17.59 1.36	19.51 3.61	14.4	.865
mh	38.03 1.53	35.07 1.58	32.96 1.85	32.87 1.54	32.06 2.35	36.11 1.92	37.03 2.02	76.9	.832
ZB	37.25 1.28	32.76 3.85	32.39 2.46	33.38 1.42	33.83 1.08	34.28 1.07	36.48 1.39	44.8	.398
BB	26.96 .98	25.31 1.54	24.78 2.00	26.25 1.06	25.01 .93	26.36 .75	26.17 .80	21.6	.167
bl	12.71 1.11	10.83 .73	9.33 .84	10.18 1.03	11.08 1.07	11.43 .59	11.44 1.40	47.6	.541
RD	18.90 1.34	14.84 .85	15.92 1.95	14.09 1.07	15.49 1.39	16.76 1.00	17.68 1.63	34.3	.189
POB	10.29 2.02	8.00 .64	8.35 .85	10.60 1.43	8.17 1.33	8.09 1.38	8.52 1.68	35.9	.98

S. v.: *Sylvilagus varyaensis* new sp.; *S. b. B*: *S. brasiliensis* (Brazil); *S. b. V.*: *S. brasiliensis* (Venezuela). *S. b. m.*: *S. b. meridensis*; *S. f. c.*: *S. f. continentis*; *S. f. o.*: *S. f. orinoci*; *S. f. v.*: *S. f. valenciae*; *: Cranial characteristic of *S. f. valenciae* significantly larger than those of *S. varyaensis*. For skull characteristics, see Appendix 1.

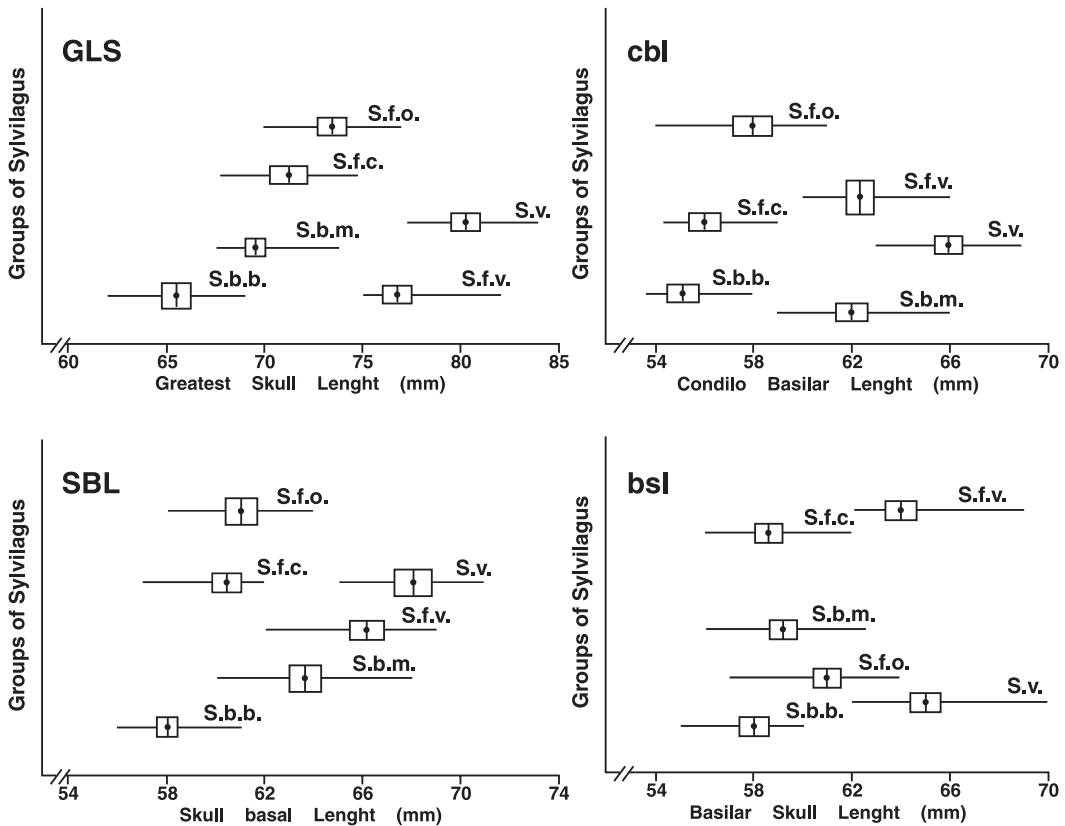


Fig. 2. Four main cranial measurements of *S. varynaensis* (S.v.) compared with those of the other groups of rabbits. S.b.b.: *S. b. brasiliensis*. S.b.m.: *S. b. meridensis*. S.f.v.: *S. f. valenciae*. S.f.c.: *S. f. continentis*. S.f.o.: *S. f. orinoci*. For each Fig.: Vertical bar: mean. Square: one standard deviation. Horizontal bar: range.

flattened part of the primary hairs 13.79 ± 0.86 mm, and they consist of 4-color bands (Table 6, Fig. 6). The black (B) terminal band was the largest (5.35 ± 1.30 mm). It is followed by a dark-reddish (1.115 ± 0.27 mm), a light-reddish (4.38 ± 0.59 mm), and a second dark-reddish (2.92 ± 1.27 mm) band.

Proximal sections of dorsal hair cylindrical and dark-gray. In this body region a secondary grooved hair also exists, thinner and less abundant than the principal hair, dark-reddish at the distal section (26.3 ± 0.84 mm), and light-red at the proximal section (5.54 ± 1.05 mm). Cover hairs cylindrical, distal section dark-red (7.8 ± 0.9 mm), and proximal section light-gray (4.2 ± 0.6 mm).

Lateral coloration light buffy. Distal section of primary hairs grooved, with only dark and light-red bands. This last section was the longest one recorded (54%) within the hair sampling process. Distal section of cover hairs light-red (2.4 ± 0.3 mm), and proximal one light-gray (7.4 ± 1.06 mm).

Ventral surface whitish. Primary hairs less abundant. Terminal band of distal section grooved, almost translucent. Remainder section cotton-white (10.00 ± 1.20 mm). Secondary hairs were dominant, cylindrical, cotton-white, bent in more than 10 loops.

Gular patch reddish-cinnamon, 125.8 ± 0.56 mm in length x 39 ± 0.23 mm, the greatest value within the rabbit groups considered.

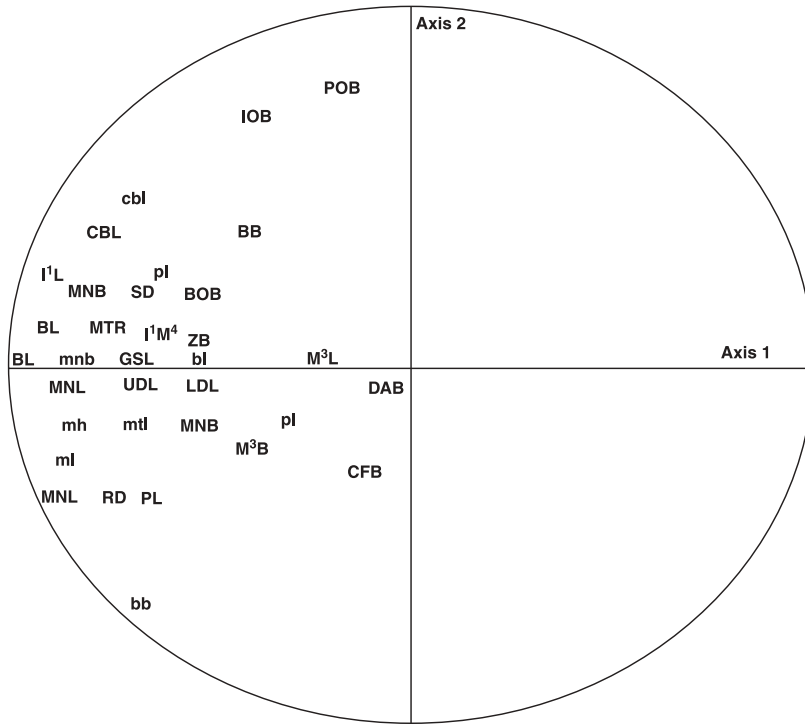


Fig. 3. Relationship between the 35 skull variables and the first two Principal Components.

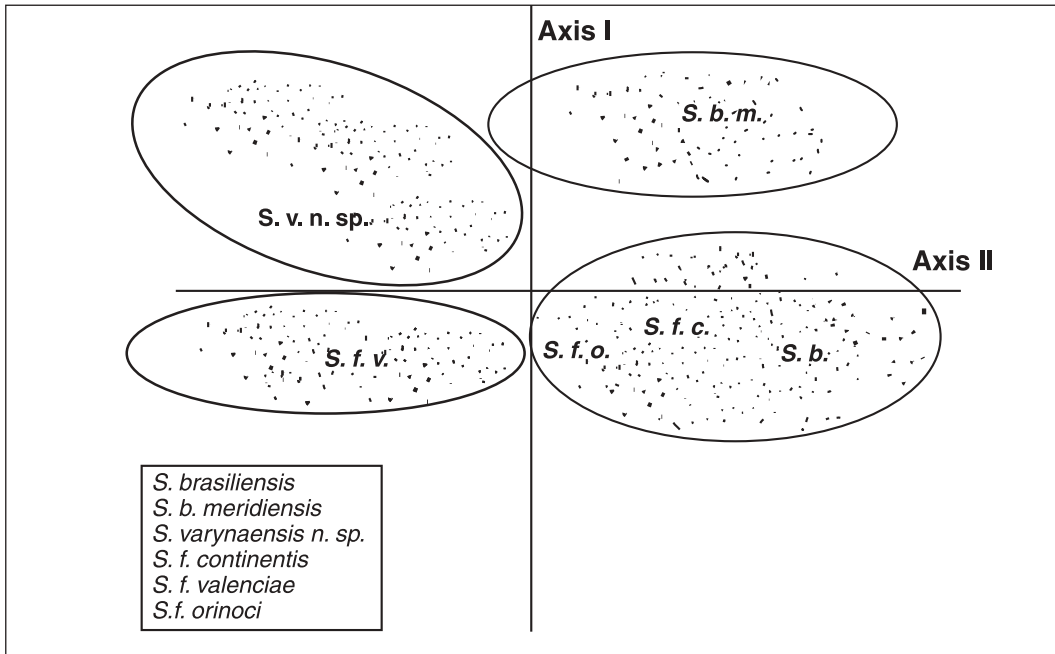


Fig. 4. Distribution of the individuals in the plane of the two first components. *S. b. brasiliensis* from Brazil (*S. b. B*) and from Venezuela (*S. b. V*) have been combined in one group.

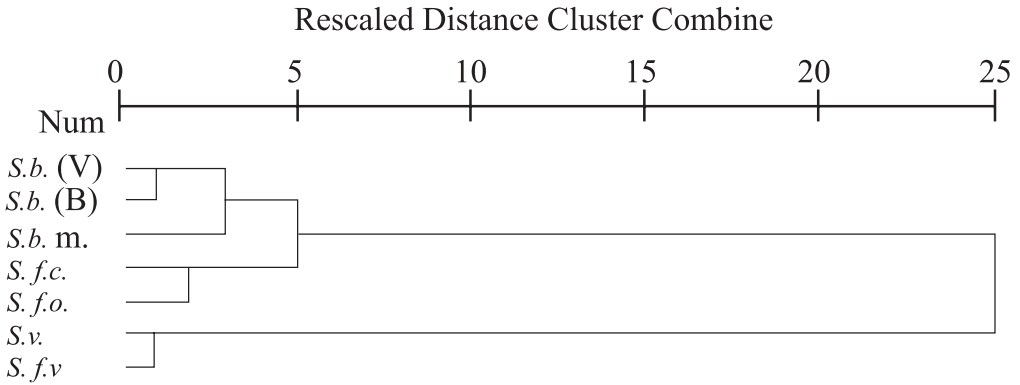


Fig. 5. Cluster Analysis for Venezuelan *Sylvilagus* groups. *S. b. V.*: *S. brasiliensis* from Venezuela. *S. b. B.*: *S. brasiliensis* from Brazil. *S. b. m.*: *S. b. meridensis*. *S. f. c.*: *S. floridanus continentis*. *S. f. o.*: *S. f. orinoci*. *S. v.*: *S. varynaensis* n. sp. *S. f. v.*: *S. f. valenciae*.

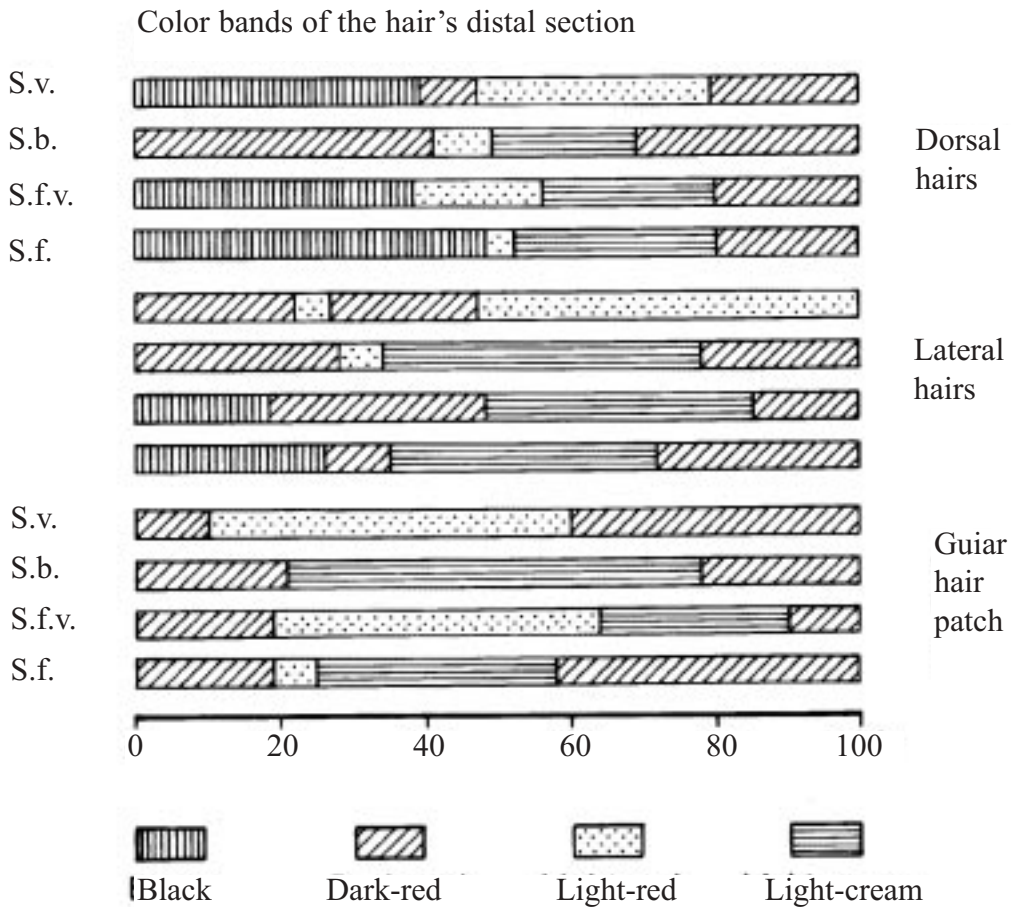


Fig. 6. Length (%) of color bands of the hair distal section of *S. varynaensis* n. sp. (*S.v.*) compared with those of *S. brasiliensis* (*S.b.*), *S. floridanus valenciae* (*S.f.v.*) and *S. floridanus* (*S.f.*) from Texas, USA.

TABLE 5

Length (mm) of color bands of the distal section of S. varynaensis new sp. compared with those of other rabbit groups. Mean and standard deviation

Color bands of the hair's distal section Body regions of the rabbit groups							Total length (mm)
<i>S. varynaensis</i>	B	DR	LR	LC	DR	LR	
Dorsal	5.35	1.15	4.38	NP	2.92	NP	13.79
	1.30	.27	.59	—	1.27	—	.86
Lateral	NP	4.63	1.02	NP	4.00	11.20	20.85
	—	1.05	.22	—	.32	.46	.51
Gular patch	NP	.98	4.89	NP	3.87	NP	9.74
	—	.25	.71	—	.50	—	.94
<i>S. brasiliensis</i>							
Dorsal	NP	8.01	1.34	3.80	6.02	NP	19.17
	—	.51	.04	.27	.70	—	
Lateral	NP	4.79	1.09	7.54	3.57	NP	16.99
	—	.69	.03	.54	.88	—	.54
Gular patch	NP	2.63	NP	7.32	2.75	NP	12.70
	—	.26	—	.48	.29	—	.34
<i>S. b. meridensis</i>							
Dorsal	NP	4.52	.45	2.77	7.11	NP	14.85
	—	.78	.11	.42	.56	—	.47
Lateral	NP	5.33	.56	6.00	1.77	NP	13.66
	—	.67	.10	.47	.14	—	.35
Gular patch	NP	2.64	NP	4.48	2.25	NP	9.33
	—	.20	—	.33	.19	—	.24
<i>S.f. continentis</i>							
Dorsal	1.25	5.33	3.79	NP	3.49	NP	13.86
	.14	1.25	.60	—	.25	—	.56
Lateral	NP	3.45	1.53	NP	4.92	2.34	12.24
	—	.62	.21	—	.53	.31	.31
Gular patch	Golden-reddish all through						9.37
<i>S. f. valenciae</i>							
Dorsal	4.81	NP	2.43	3.22	2.87	NP	13.33
	.62	—	.24	.57	.20	—	.41
Lateral	4.72	1.43	NP	3.94	2.62	NP	12.71
	.12	.03	—	.15	.20	—	.13
Gular patch	NP	2.43	1.23	3.30	5.67	NP	12.63
	—	.12	.24	.46	.05	—	.22
<i>S. floridanus</i>							
Dorsal	5.76	NP	.50	3.37	2.33	NP	11.95
	.37	—	.02	.23	.11	—	.18
Lateral	3.35	.45	NP	5.40	3.79	NP	12.99
	.40	.08	—	.24	.52	—	.31
Gular patch	NP	1.96	.45	3.44	4.23	NP	10.10
	—	.30	.04	.24	.32	—	.23

B: black; DR: dark-red; LR: light-red; LC: light-cream; NP: not present.

Distal section of primary hairs much thinner than those of dorsal and lateral regions. Two dark-red bands (0.98 ± 0.25 , and 3.87 ± 0.50 mm in length, respectively) were separated by a light-red band of 4.89 ± 0.71 mm in length (Table 5, Fig. 6).

Dorsal surface of the hind legs reddish-cinnamon, mixed with light-cream and white hairs toward the distal region. Similar coloration was found for the dorsal surface of the forelegs. Internal side of the thigh reddish-cream. Dorsal base of the tail reddish-cinnamon. Distal section of the primary hairs contained dark-red, shorter, less intense and light-red bands longer than the corresponding bands in the primary hairs of the dorsal region of the body. Proximal section of the hair dark-red, thinner and cylindrical, bent in more than four loops. Length of this section was 11.8 ± 3.20 mm. Cover hairs of two types: one light-reddish with red terminal band, and the other whitish, or reddish-cream. Primary hairs of the terminal part of the tail bent in numerous loops. Principal hairs and cover hairs of the ventral tail region were similar to those of the dorsal base. Some primary hairs had a whitish distal section with a reddish-cream terminal band. Cover hairs dark-gray.

Color patterns of paratypes: There were no significant differences in color patterns between the holotype and paratypes. Female dark-reddish bands of dorsal region were longer than those of the holotype. In males, the reddish-cinnamon color of the nuchal patch and the reddish-buffy color of the tail ventral surface were less intense than the colors on the dorsal surfaces.

Differences between the hair color bands (distal section) of *S. varynaensis* and the other three groups of *Sylvilagus*

Hairs of the dorsal surface: Dark-red bands were dominant in *S. brasiliensis* (73.2%) and there were no black bands in this species. *S. f. valenciae* had the longest black band (48.2). Black (38.8%) and light-red (31.8%) were dominant bands in the new species. The other three groups had a light-cream band, as is shown in Fig. 6.

Hairs of the lateral surface: About 54% of the distal hair length was occupied by a light-reddish band in *S. varynaensis*. This band was reduced (6.4%) in *S. brasiliensis*, and absent in the other two groups.

Gular hair patch: No black bands were present in any of the group studied. There were only two color bands (DR and LR) in *S. varynaensis*. The light cream band was the longest (57.6%) in *S. brasiliensis* and the DR-band was dominant (64.1%) in *S. f. valenciae*. The light-red band was the shortest one in *S. floridanus* from Texas. (Table 5, Fig. 6).

S. f. continentis differs from the other groups in having the shortest (1.25 ± 0.14 mm) terminal black band (dorsal body surface) and the distal hair section of the gular patch entirely golden-reddish.

From these data it seems that each group of rabbit has a specific pattern of color bands in the distal hair sections of the body regions considered above.

Therefore, body measurements, color and pelage distribution, distribution and color patterns of the hair bands, cluster and principal component analysis of data recorded for cranial measurements, enable us to recognize this rabbit as a new species. *Sylvilagus varynaensis* is the largest and darkest of the known Venezuelan rabbits, with a broad elongated skull.

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RESUMEN

Se describe una especie nueva de conejo silvestre de Venezuela procedente del Fundo Millano (08° 46' N y 69° 56' W) entre 120 y 180 m de altitud y Chorroscoco Bajo (08° 05' N and 69° 18' W), entre 190 y 120 de altitud, en el estado Barinas. La descripción se basó en: 1. Medidas corporales y craneales. 2. Patrones de coloración del pelaje. 3. Organización y longitud de las bandas de color del pelo de las regiones dorsal, lateral, ventral, nugal y mancha gular. Las medidas corporales, craneales y algunos de los patrones de coloración de la nueva especie, *Sylvilagus varynaensis*, fueron comparados con las de los grupos más cercanos, como *S. brasiliensis* (de Venezuela y de Brasil), *S. b. meridensis* de los páramos venezolanos y tres de los grupos más representativos de *S. floridanus* (*S. f. continentis*, *S. f. orinoci*, *S. f. valenciae*). La mayoría de los valores registrados en estas medidas fueron significativamente más altos ($P < 0.005$; "t" de Student) en la nueva especie de conejo. El Análisis de Componentes Principales y de Agrupación de los datos registrados para las características craneales indicaron que *S. varynaensis* es el conejo silvestre de mayor tamaño de Venezuela, de coloración más oscura, de cráneo más alargado y con arreglo diferente de las bandas de color del pelo en varias regiones corporales.

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APPENDIX 1

Skull measurements in some groups of Venezuelan rabbits.

01. GSL. Greatest skull length. From anterior face of I¹ to the most posterior point of the supraoccipital shield.
02. BL. Basal length. Ventro-median notch of the foramen magnum to the anterior face of I¹.
03. CBL. Condilo basal length. Anterior face of the condilar process to the anterior face of I¹.
04. bsl. Basilar skull length. Ventro-median notch of the foramen magnum to the posterior face of I¹.
05. cbl. Condilo basilar length. Anterior face of the condilar process to the posterior face of I¹. 06. PL. Palatal length. Least length of the palate bone.
07. pl. Palatilar length. Least length of the palatal bridge.
08. pb. Palatilar breadth. Least breadth of the palatal bridge.
09. MNL. Major nasal length. Greatest length of nasal bone.
10. mnl. Minor nasal length- Minor length of nasal bone.
11. MNB. Major nasal breadth. Greatest breadth across both nasals.
12. mnb. Minor nasal breadth. Minor breadth across both nasal.
13. MB. Greatest breadth across M³.
14. MTR. Maxillary toothrow length. Alveolar length of the toothrow PM³ - M³.
15. MTL. Mandibular toothrow length. Anterior alveolar border of PM₃ to the posterior alveolar border of M₃.
16. UDL. Upper diastema length. Posterior alveolar border of I¹ to the anterior alveolar border of PM².
17. LDL. Lower diastema length. Posterior alveolar border of I₂ to the anterior alveolar border of PM₂.
18. I¹L. Incisive length. Length of an upper incisive.
19. ml. Mandibular length. Anterior point of the alveolus of PM₃ to the most posterior extension of the angular process.
20. mh. Mandibular height. Most anteroventral extension of the angular process to the most dorsal part of the coronoid process.
21. mb. Mandibular breadth.
22. I¹M⁴. Length of I¹M⁴.
23. M³L. Length of the third upper molar.
24. M³B. Breadth of the third upper molar.
25. ZB. Zygomatic breadth. Greatest breadth across both zygomatic arches.
26. IOB. Interorbital breadth. Least breadth at the interorbital bridge.
27. BB. Breadth of the braincase. Greatest breadth taken underneath the face projection of each zygomatic arch.
28. CFB. Carotid foramina breadth. Distance between the two foramina.
29. DAB. Diameter of the auditory bulla.
30. POB. Post-occipital breadth.
31. BOB. Basioccipital breadth. Greatest breadth between the bulla.
32. bl. Bullar length. Greatest antero-posterior length of the bulla.
33. bb. Bullar breadth. Distance between the most lateral margins of the both bullae.
34. RD. Rostrum depth. From the most ventral point of the rostrum dorsally in a line perpendicular to the length of the ventral surface of the rostrum to the most dorsal surface of the nasals.
35. SD. Greatest height of the skull above a glass slide positioned such that the upper incisors and mastoid processes rest upon the slide.