

Additions to the description of *Ctenosaura flavidorsalis* KÖHLER & KLEMMER, 1994 and its occurrence in south-western Honduras, El Salvador, and Guatemala (Squamata: Sauria: Iguanidae)

Ergänzungen zur Beschreibung von *Ctenosaura flavidorsalis* KÖHLER & KLEMMER, 1994
und ihr Vorkommen in Südwest-Honduras, El Salvador und Guatemala
(Squamata: Sauria: Iguanidae)

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KURZFASSUNG

Es wird gezeigt, daß die Schwarzleguanpopulationen in El Salvador, die bislang als *Ctenosaura quinquecarinata* (GRAY, 1842) angesehen wurden, artgleich mit *C. flavidorsalis* KÖHLER & KLEMMER, 1994 sind. Für letztere Art werden Pholidosemerkmale und Färbung beschrieben. Das dokumentierte Verbreitungsgebiet von *C. flavidorsalis* erstreckt sich vom östlichen Guatemala bis zum östlichen El Salvador und schließt das südwestliche Honduras und das Comayagua-Becken im südlich-zentralen Honduras mit ein.

ABSTRACT

The *Ctenosaura* populations from El Salvador previously referred to *C. quinquecarinata* (GRAY, 1842) are demonstrated to be conspecific with *C. flavidorsalis* KÖHLER & KLEMMER, 1994. Scalation characters and a detailed colour description of this latter species are presented. The documented distribution of *C. flavidorsalis* extends from eastern Guatemala to eastern El Salvador and from south-western Honduras to the Comayagua Valley in south-central Honduras.

RESUMEN

Las poblaciones de El Salvador previamente referidas como *Ctenosaura quinquecarinata* (GRAY, 1842) son identificadas como *C. flavidorsalis* KÖHLER & KLEMMER, 1994. Se presentan caracteres de escamación y una descripción detallada sobre la coloración de esta última especie. La distribución documentada de *C. flavidorsalis* se estrecha a partir de el este de Guatemala hacia el noreste de El Salvador y de el suroeste de Honduras hacia el Valle de Comayagua en Honduras surcentral.

KEY WORDS

Squamata, Sauria, Iguanidae, *Ctenosaura flavidorsalis*, *Ctenosaura quinquecarinata*, distribution, Honduras, El Salvador, Guatemala, México, Nicaragua

INTRODUCTION

In 1994, KÖHLER & KLEMMER described the spiny tailed iguanid lizard *Ctenosaura flavidorsalis* from La Paz, Honduras. This species was since thought to be restricted to the Comayagua Valley, a region that includes the type locality (KÖHLER 1995a, 1999). During a two day stay (22-23 October 1998) in the southern part of Departamento de Intibuca, Honduras, G.K. and J.R.M. collected several specimens of *C. flavidorsalis*. Due to the close proximity of this latter site to the northern border of El

Salvador, this finding led us to re-examine the identity of the El Salvadoran populations that previously were referred to *C. quinquecarinata* (GRAY, 1842) (HIDALGO 1980; GICCA 1983; VILLA et al. 1988; KÖHLER 1993, 1995b). In addition, one of us (C. R.H.) surveyed suitable *Ctenosaura* habitats in Nicaragua, Honduras, El Salvador, Guatemala and México from February to September 1999, to study the geographic distribution of the *C. quinquecarinata* - *flavidorsalis* complex. Here we report on our

new understanding of the distribution of *C. flavidorsalis* and present additional descriptive data on its scalation and colour pattern. A comprehensive morphological

and molecular comparison of the *C. quinquecarinata*-like populations throughout their range will be presented elsewhere.

MATERIALS AND METHODS

The specimens of *Ctenosaura* collected by C.R.H. during the course of this study were deposited in the collections of The Natural History Museum (BMNH), London; Forschungsinstitut und Naturmuseum Senckenberg (SMF), Frankfurt a. M.; Museo de Historia Natural de El Salvador (MUHNES), San Salvador; Museo de Zoología "Alfonso Herrera" (MZFC), México; and Colecciones Zoológicas "Mario Dary Rivera", Museo de Historia Natural, Universidad de San Carlos de Guatemala (USAC), Ciudad de Guatemala.

These specimens are listed along with additional comparative material in the Appendix. Specimens of *C. flavidorsalis* from Guatemala, El Salvador and southern Honduras were directly compared to *C. quinquecarinata* specimens recently collected in Oaxaca, México and in Nicaragua and to additional museum specimens. Terminology of scalation characters follows SMITH (1946) and DE QUEIROZ (1987). Colours and colour codes (the latter in parentheses) beginning with capital letters are those of SMITHE (1975-1981). Comparative data (table 1) for 9 selected scalation characters in *C. flavidorsalis* from the species' type locality were taken from KÖHLER & KLEMMER (1994). These include: number of femoral pores (FP); number of lamellae under fourth toe (TL); number of scales

between supraorbitals (BSO); number of sublabials (SBL); number of supralabials (SPL); number of postmental scales (PM); number of enlarged middorsal scales (MDS); number of transversal dorsal scale rows behind posterior end of middorsal crest (PDR); number of spinous caudal whorls (SWRL).

Student *t* tests (95% confidence interval), Mann-Whitney *U* tests and multivariate Discriminant function analysis were run on SPSS version 10.0.5. The populations were tested for sexual dimorphism and interpopulational differences. All characters were normally distributed except for PDR which was square root transformed, SWRL which was subdivided into three groups: (1) ≤ 4 , (2) 5-8, (3) ≥ 9 , BSO which was dichotomised as follows: (1) 1 and (2) 2-3, and PM which was dichotomised as follows: (1) 2 and (2) 3-4. No significant differences were found on all scalation characters when tested against sex. Numbers of lamellae were excluded from discriminant function analysis, as they are not significantly different between groups. Discriminant function analysis was used to predict group membership of the *Ctenosaura flavidorsalis* (SMF 75845) and to evaluate the phenetic distinctiveness of *a priori* groups. Ecological life zone definitions follow HOLDRIDGE (1967).

RESULTS AND DISCUSSION

The discriminant function analysis scatter plot is consistent with *t* and *U* tests reflecting differences between the lizards referred to as *C. quinquecarinata* examined from Oaxaca, México and from Nicaragua versus *C. flavidorsalis* from La Paz, Honduras as well as Guatemala, El Salvador and southwestern Honduras. The first and second discriminant functions accounted for 91.3 % and 5.1 % respectively, of the between-group variability. As shown in figure 1, the first discriminant function

maximally separates the populations of *C. quinquecarinata* like lizards from Oaxaca, México and Nicaragua from those populations of *C. flavidorsalis* from La Paz, Honduras and those from Guatemala, El Salvador and SW Honduras. The structure matrix of correlations between predictors and discriminant functions, as seen in table 2, suggests that the best predictors for distinguishing between the populations is the number of spinous caudal whorls (SWRL, $r = 0.734$) and femoral pores (FP, $r = 0.313$)

Table 1: Comparison of descriptive statistics of nine selected morphometric and pholidotic characters in *Ctenosaura flavidorsalis* from five regions. Range (mean value \pm standard deviation; and sample size) are indicated. Abbreviations: FP - number of femoral pores; TL - number of lamella under fourth toe; BSO - number of scales between supraorbitals; SBL - number of sublabialia; SPL - number of postmental scales; MDS - number of postmental scales; MDS - number of enlarged middorsal scales; PDR - number of transversal dorsal scale rows behind posterior end of middorsal crest; SWRL - number of spinous caudal whorls.

Tab. 1: Vergleich der deskriptiven Statistiken von neun ausgewählten morphometrischen und pholidotischen Merkmalen bei *Ctenosaura flavidorsalis* aus fünf Gebieten. Spannweite (Mittelwert \pm Standardabweichung; und Stichprobenumfang) sind angegeben. Abkürzungen: FP - Anzahl Femoralporen; TL - Anzahl Lamellen an der Unterseite der vierten Zehe; BSO - Anzahl Schuppen zwischen den Supraorbitalia; SBL - Anzahl Sublabialia; SPL - Anzahl Supralabialia; PM - Anzahl Postmentalschilde; MDS - Anzahl vergrößerter Schilde in Rückenmitte; PDR - Anzahl Rückenschuppenquerreihen hinter dem caudalen Ende des Rückenkanalles; SWRL - Anzahl stacheliger Schwanzwirbel.

Character / Merkmal	Comayagua valley, Honduras		NE El Salvador + SW Honduras		E Guatemala + W El Salvador		Oaxaca, México		Nicaragua
	FP	6 - 10 (7.8 \pm 1.14; 10)	27 - 32 (29.7 \pm 1.53; 19)	6 - 9 (7.5 \pm 0.84; 19)	7 - 8 (7.6 \pm 0.50; 19)	5 - 8 (6.3 \pm 0.81; 19)	26 - 33 (30.4 \pm 2.15; 20)	5 - 7 (6.3 \pm 0.67; 20)	
TL	1 - 2 (1.4 \pm 0.52; 10)	8 - 12 (9.2 \pm 0.93; 19)	1 - 3 (1.5 \pm 0.61; 19)	1 - 2 (1.3 \pm 0.48; 19)	1 - 2 (1.08 \pm 0.27; 19)	1 - 2 (1.1 \pm 0.3; 20)	1 - 2 (1.1 \pm 0.3; 20)		
BSO	9 - 11 (9.6 \pm 0.69; 10)	9 - 11 (9.4 \pm 0.84; 10)	8 - 9 (8.3 \pm 0.49; 19)	7 - 9 (7.8 \pm 0.63; 19)	7 - 9 (8.2 \pm 0.57; 19)	8 - 10 (9.1 \pm 0.71; 20)	8 - 10 (9.1 \pm 0.71; 20)		
SBL	2 - 4 (3.8 \pm 0.63; 10)	2 - 4 (3.2 \pm 0.97; 19)	2 - 4 (3.2 \pm 0.97; 19)	2 - 4 (3.1 \pm 0.99; 19)	2 - 3 (2.04 \pm 0.21; 19)	7 - 10 (8.3 \pm 0.86; 20)	7 - 10 (8.3 \pm 0.86; 20)		
SPL	57 - 68 (63.2 \pm 3.30; 10)	38 - 73 (60 \pm 8.35; 17)	38 - 73 (60 \pm 8.35; 17)	42 - 77 (57 \pm 8.06; 12)	48 - 72 (54.41 \pm 4.28; 19)	49 - 60 (54.75 \pm 3.2; 20)	49 - 60 (54.75 \pm 3.2; 20)		
PM	15 - 30 (18.8 \pm 5.33; 10)	14 - 55 (23.7 \pm 10.64; 16)	14 - 55 (23.7 \pm 10.64; 16)	12 - 47 (24 \pm 9.63; 12)	14 - 44 (19.84 \pm 4.37; 19)	11 - 26 (15.93 \pm 4.1; 20)	11 - 26 (15.93 \pm 4.1; 20)		
MDS	11 - 13 (11.63 \pm 0.67; 11)	8 - 13 (10.8 \pm 1.27; 21)	8 - 13 (10.8 \pm 1.27; 21)	8 - 13 (10 \pm 1.47; 12)	3 - 7 (4.2 \pm 0.956; 19)	4 - 12 (6.15 \pm 2.52; 20)	4 - 12 (6.15 \pm 2.52; 20)		

Table 2 (left): Pooled within-groups correlations between discriminating variables and standardised canonical discriminant functions 1 and 2. Variables ordered by absolute size of correlation within function. * - Largest absolute correlations between each variable and any discriminant function. The abbreviations of the variables are explained in table 1.

Tab. 2 (links): Gepoolte within-groups Korrelationen zwischen den diskriminierenden Variablen und den standardisierten kanonischen Diskriminanzfunktionen 1 und 2. Reihung der Variablen nach der absoluten Höhe der Korrelation innerhalb der Funktion. * - Absolut höchste Korrelationen bei jeder der beiden Diskriminanzfunktionen. Die Variablenabkürzungen sind in Tabelle 1 erklärt.

Variable	Function 1	Function 2
SWRL	0.734*	0.208
FP	0.313*	-0.012
SPL	0.041	0.720*
SBL	-0.007	0.598*
MDS	0.125	-0.358
PDR	0.345	0.296
PM	0.168	-0.125
BSO	0.142	0.327

Discriminant Function Analysis

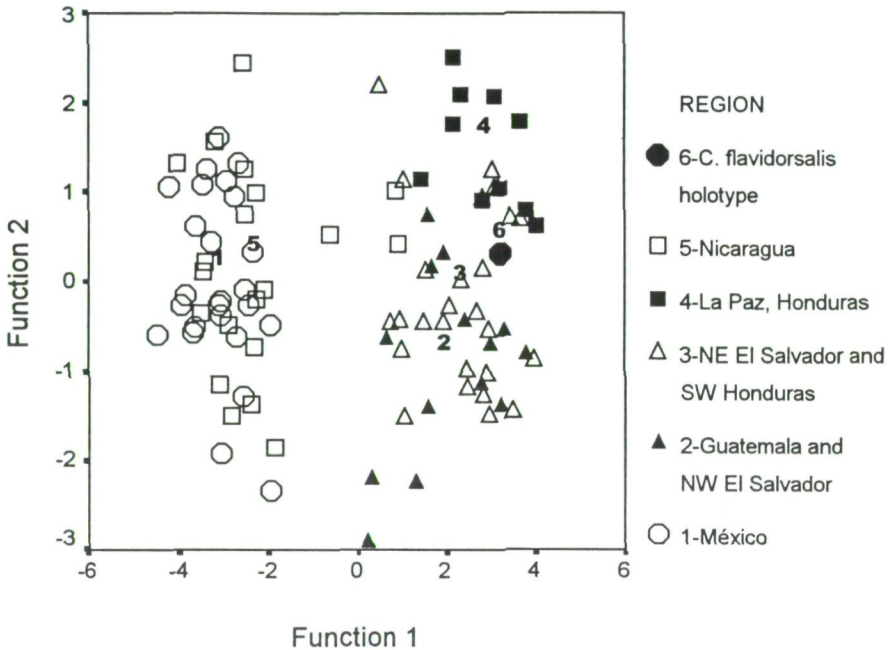


Fig. 1. Canonical Discriminant Function analysis comparing 8 morphological characters (taken from KÖHLER & KLEMMER 1994) predicting group membership of the *Ctenosaura flavidorsalis* holotype (SMF 75845) (6) and comparing the studied *Ctenosaura quinquecarinata*-like populations from Oaxaca, México (1), Guatemala and NW El Salvador (2), NE El Salvador and SW Honduras (3), and Nicaragua (5) and the *C. flavidorsalis* populations from the type locality of La Paz, Comayagua Valley, Honduras (4). See text and table 1 for character descriptions.

Abb. 1: Kanonische Diskriminanzfunktionen 8 morphologischer Merkmale (nach KÖHLER & KLEMMER 1994). Dargestellt ist der Holotypus von *Ctenosaura flavidorsalis* (SMF 75845) (6) im Vergleich zu den untersuchten *Ctenosaura quinquecarinata*-artigen Populationen aus Oaxaca, Mexiko (1), Guatemala und NW El Salvador (2), NE El Salvador und SW Honduras (3) sowie Nicaragua (5) und den *Ctenosaura flavidorsalis* Populationen von der Typuslokalität in La Paz, Comayagua-Becken, Honduras (4). Die Merkmale sind im Text beschrieben und in Tabelle 1 angeführt.

for the first function and the number of supralabialia (SPL, $r = 0.720$), and sublabialia (SBL, $r = 0.598$) for the second function. The *C. flavidorsalis* holotype clusters well within those from northern El Salvador, south-western Honduras and eastern Guatemala. These latter populations share the same diagnostic characters and range of scale counts with *C. flavidorsalis* lizards (table 1). We therefore conclude that the populations of *C. quinquecarinata*-like iguanas from El Salvador, Guatemala and south-western Honduras are conspecific with *C. flavidorsalis* from its type locality.

In *C. flavidorsalis*, there is usually some yellow coloration present in the dor-

sum of adults (fig. 2), some of the scales on the dorsal side of the thigh are distinctly enlarged, keeled and spinous, all dorsal caudal scales between the whorls of enlarged spinous scales (paramedian scales) are strongly keeled or even spinous, there are 2-4 postmental scales, and males have a very low middorsal crest (maximum length of crest spines 1.2 mm). In *C. quinquecarinata*, there is never yellow coloration present on the dorsum, scales on the dorsal surface of the thigh are not distinctly enlarged, and, except for the proximal 3-7 (average 4.5) caudal whorls of enlarged spinous scales, only the median and the two lateral series of caudal scales are spinous, whereas



Fig. 2: Adult male (SMF 79510) of *Ctenosaura flavidorsalis* in life from Departamento de Morazan, El Salvador. SVL 152.0 mm.

Abb. 2: Adultes Männchen (SMF 79510) von *Ctenosaura flavidorsalis* im Leben; Departamento de Morazan, El Salvador; Kopf-Rumpf-Länge 152,0 mm.



Fig. 3: Juvenile (SMF 79128) of *Ctenosaura flavidorsalis* in life from Departamento de Intibuca, Honduras. SVL 79.4 mm.

Abb. 3: Jungtier (SMF 79128) von *Ctenosaura flavidorsalis* im Leben; Departamento de Intibuca, Honduras. Kopf-Rumpf-Länge 79,4 mm.

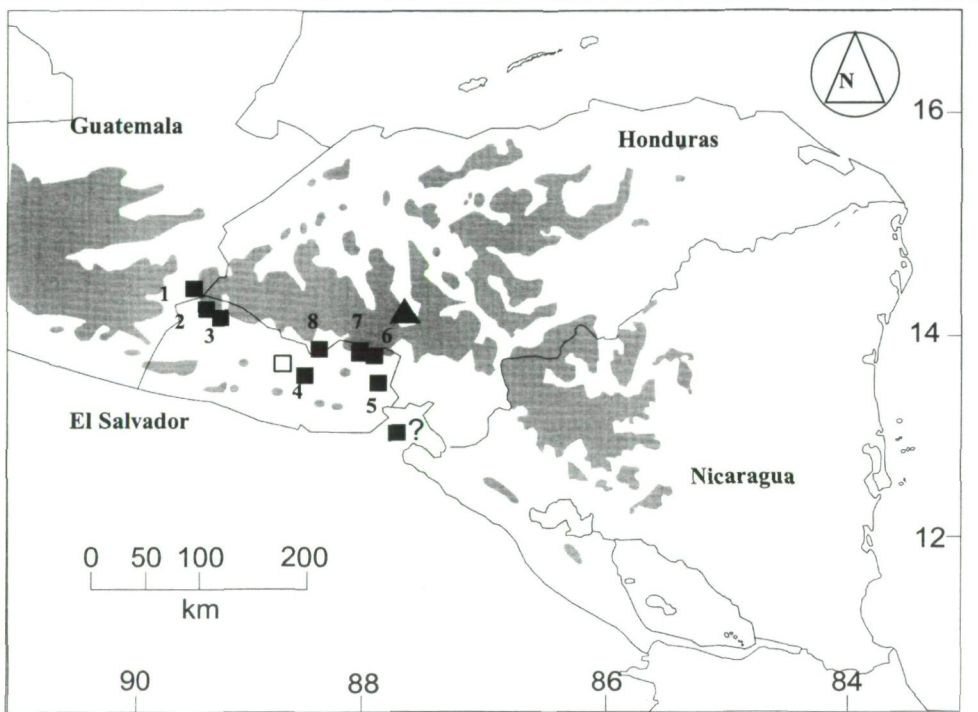


Fig. 4: Map indicating the geographic distribution of *Ctenosaura flavidorsalis*. Solid squares (■) mark localities of specimens examined for this study, the triangle (▲) marks the type locality (La Paz, Comayagua Valley, Honduras), and the open square (□) marks an additional literature record (Dept. Cabañas, El Salvador - HIDALGO 1980). The question mark (?) next to the locality record Isla Conchagueta, Golfo de Fonseca, El Salvador (MUHNES C-390) indicates that this record is in doubt (see text).

Numbering of solid squares: Guatemala, Dept. Jutiapa: El Rincón (1); El Salvador, Dept. Santa Ana, Metapán: Casas de Teja (2), Santa Rita (3); Dept. San Vicente: San Ildefonso (4), Dept. La Unión: El Sauce (5); Dept. Morazán, Corinto: Cerro El Aguacate (6), Cerro El Junco (7); Honduras, Dept. Intibucá: Santa Lucía (8).

Abb. 4: Karte zur Verbreitung von *Ctenosaura flavidorsalis*. Gefüllte Quadrate (■) bezeichnen Fundorte von in der vorliegenden Arbeit untersuchten Exemplaren, das Dreieck (▲) markiert die Typuslokalität (La Paz, Comayagua Valley, Honduras), das ungefüllte Quadrat (□) einen weiteren Nachweis aus der Literatur (Dept. Cabañas, El Salvador - HIDALGO 1980). Das Fragezeichen (?) kennzeichnet die zweifelhafte Fundortangabe Isla Conchagueta, im Golf von Fonseca, El Salvador (MUHNES C-390) (siehe Text). Fundortnumerierung siehe oben.

the paramedian scales between these are smooth to slightly keeled; there are only two postmental scales, and a much higher middorsal crest (maximum length of crest spines 5.4 mm) usually present in adult males; females from both species have a low middorsal crest. In the Appendix we present detailed descriptions of the coloration of *C. flavidorsalis* in life of an adult male from Guatemala, an adult female from El Salvador and one juvenile from the type locality and another from Guatemala.

The documented distribution of *C. flavidorsalis* extends from eastern Guatemala (Departamento de Jutiapa) through northern El Salvador (Departamentos de Santa Ana, Cabañas [HIDALGO 1980], San

Vicente, Morazán and La Unión) into south-western Honduras (Departamento de Intibucá) and south-central Honduras (Departamento de La Paz). There is a single preserved specimen labelled as originating from Isla Conchagueta, Golfo de Fonseca, El Salvador (MUHNES C-390) without additional collecting data. C.R.H. visited the latter locality, but was not able to find evidence for the existence of the species there. Refer to figure 4, and Appendix for exact localities. As currently understood, *C. flavidorsalis* mainly inhabits the Tropical Dry Forest and Subtropical Dry Forest formations (HOLDRIDGE 1967, MAG/FAO 1975, MAG/CATIE 1978) from 35 to 1010 m elevation.

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REFERENCES

- DE QUEIROZ, K. (1987): Phylogenetic systematics of iguanine lizards: a comparative osteological study.- Univ. California Publ. Zool., Berkeley, 118: i-xiii + 1-203.
- GICCA, D. F. (1983): *Enyaliosaurus quinquecarinatus*; pp. 329.1-329.2. In: POWELL, R. (ed.): Catalogue of American Amphibians and Reptiles. Athens, Georgia (SSAR).
- GRAY, J. E. (1842): Description of some new species of reptiles, chiefly from the British Museum.- Zool. Misc., London; 1842: 57-59.
- HIDALGO, H. (1980): *Enyaliosaurus quinquecarinatus* (GRAY) and *Leptodeira nigrofasciata* GÜNTHER in El Salvador.- Herpetol. Review, Athens, Georgia; 11 (2): 42-43.
- HOLDRIDGE, L. R. (1967): Life zone ecology. Revised edition. San Jose, Costa Rica (Tropical Science Center), 206 pp.
- KÖHLER, G. (1993): Schwarze Leguane - Freilandbeobachtungen, Pflege und Zucht. Offenbach (Herpeton Verlag), 126 pp.
- KÖHLER, G. (1995a): De soorten Zwarte Leguanen (*Ctenosaura*).- Lacerta, Leiden; 54 (1): 13-28.
- KÖHLER, G. (1995b): Freilanduntersuchungen zur Morphologie und Lebensweise des Fünkiel-Schwarzleguans- *Ctenosaura quinquecarinata* am Isthmus von Tehuantepec, Mexiko.- Herpetofauna, Weinstadt; 17 (97): 21-26.
- KÖHLER, G. (1999): Herpetologische Beobachtungen in Honduras. II. Das Comayagua-Becken.- Natur und Museum, Frankfurt a. M.; 129 (7): 212-217.
- KÖHLER, G. & KLEMMER (1994): Eine neue Schwarzleguanart der Gattung *Ctenosaura* aus La Paz, Honduras.- Salamandra, Rheinbach; 30 (3): 197-208.
- MAG/CATIE [Ministerio de Agricultura y Ganadería/Centro Agronómico Tropical de Investigación y Enseñanza] (1978): Mapa Ecologico de El Salvador (Elaborado por TOSSI Jr. y HARTSHORN). Ministerio de Agricultura y Ganadería, MAG, San Salvador, El Salvador.
- MAG/FAO [Ministerio de Agricultura y Ganadería/Food and Agriculture Organization] (1975): Zonas de vida ecológicas de El Salvador. Programa de las Naciones Unidas para el desarrollo. PNUD/FAO/ELS/73/004. Documento de Trabajo No. 6. Depto. Información Agropecuaria, MAG, San Salvador, El Salvador: 98 pp.
- SMITH, H. M. (1946): Handbook of lizards. Lizards of the United States and Canada. Ithaca, New York (Comstock Publ.), 557 pp.
- SMITHE, F. B. (1975-1981): Naturalist's Color Guide. Part I. Color Guide. New York (American Mus. Nat. Hist.), 182 color swatches.
- VILLA, J. & WILSON, L. D. & JOHNSON, J. D. (1988): Middle American herpetology. A bibliographic checklist. Columbia (Univ. Missouri Press), xxxiii + 131 pp. + Appendix.

APPENDIX I

Ctenosaura flavidorsalis coloration in life

An adult male (SMF 79415), SVL 185.0 mm, from Guatemala (Departamento de Jutiapa) was recorded as follows: dorsal surface of head Vandyke Brown (121) with scattered Prout's Brown (121A) scales; rostrum Orange Yellow (18); temporal region Sepia (119), checkered with Prout's Brown (121A); loreal region Dark Drab

(119B); anterior portion of chin dirty white with Vandyke Brown blotches (221), posterior portion Straw Yellow (56); dorsal ground colour Sepia (119) with Army Brown and Natal Brown blotches (219A), medial portion covered with continuous Sulphur Yellow (157) blotches with some scattered Lime Green (159) scales; flanks

with Sepia (119) stripes that extend onto venter; venter dirty white with Spectrum Yellow (55) and Olive Yellow (52) scales; ventral surface of arms Straw Yellow (56); dorsal surfaces of feet Sepia (119) with dirty white scales; ventral surface of feet dirty white with Sepia (119) scales; dorsal surface of tail with Sepia (119) and Straw Yellow (56) bands, the latter with a suggestion of Lime Green (159); iris Raw Umber (223) turning into Sayal Brown (223C) and Tawny Olive (223D) marginally; and a thin Chamois (123D) ring around pupil.

The coloration in life of an adult female (MUHNES 30-1232), SVL 143 mm, from El Salvador (Departamento de Santa Ana) was recorded as follows: dorsal surface of head Vandyke Brown (121) with Straw Yellow (56) and Prout's Brown scales (121A); rostrum Orange Yellow (18); temporal region Sepia (119), checkered with Prout's Brown (121A); loreal region Dark Drab (119B) with scattered Orange Yellow (18) scales; chin Buff Yellow (53) with a suggestion of Orange Yellow (18) and Glaucous (80) posteriorly; dorsal ground colour Sepia (119) with scattered Lime Green (159) and Spectrum Yellow (55) scales and with Army Brown (219B), Natal Brown (219A) and Beige (219D) blotches, blotches edged either by Lime Green (159) or by Sulphur Yellow (157); venter dirty white except for chest which is suffused with Cream Color (54) and has some scattered Spectrum Yellow (55) scales; upper arm Sepia (119) with scattered Hair Brown (119A) and Olive Yellow (52) scales; dorsal surfaces of forefeet Sulphur Yellow (157) with scattered Olive Yellow (52) and Cream Color (54) scales; undersides of rear feet and tail dirty white; dorsal surface of tail Sepia (119) with Sul-

phur Yellow (157) bands that have a suggestion of Lime Green (159); iris Raw Umber (223) turning into Tawny Olive (223D) marginally; and a thin Chamois (123D) ring around pupil.

A juvenile (released), SVL 75 mm, from Guatemala (Departamento de Jutiapa) was recorded as follows: dorsal ground colour Sepia (119) with Army Brown (219B), Beige (219D) and Apple Green (61) blotches; some scattered middorsal crest scales Sulphur Yellow (157); loreal region Brownish Olive (29) with Opaline Green (162D) scales; temporal region Sepia (119) with Light Drab (119C); dorsal surface of head Vandyke (110) with Apple Green (61) scales; rostrum Straw Yellow (56) and chin Cream Color (54) with Sepia (119) blotches; venter dirty white posteriorly and diffused Cream Color (54) anteriorly; dorsal surface of upper arm Sepia (119) with Sulphur Yellow (57) scales; ventral surface of arms Cream Color (54); dorsal surface of rear feet Sepia (119) with dirty white scales; ventral surface of rear feet dirty white with scattered Sepia (119) spots; dorsal surface of tail Sepia (119) with dirty white bands; ventral surface of tail dirty white with some scattered Sepia (119) spots turning into defined bands of same color at terminal end; and a thin Chamois (123D) ring around pupil.

A juvenile (SMF 79128; fig. 3), SVL 79.4 mm, from Honduras (Departamento de Intibucá) was recorded as follows: dorsal ground colour Sepia (219) with indistinct Light Drab (119C) bands; Lime Green (159) blotches on dorsal surface of head and anterior half of dorsum. All the rest of this specimens' coloration pattern was the same as in the juvenile specimen from Guatemala.

APPENDIX II

Specimens examined

Ctenosaura flavidorsalis

Honduras: LA PAZ: 1 km south of La Paz, 750 m, 14°16'N, 87°40'W: SMF 75845 (holotype of *C. flavidorsalis*), 75910, 77084, (paratypes of *C. flavidorsalis*); INTIBUCA: Santa Lucia, 375 m, 13°55.17'N, 88°23.43'W: SMF 79126-28.

Guatemala: JUTIAPA: ca. 15 km SE Agua Blanca, Aldea El Rincón, 900 m: USAC 001-02, 559-61, BMNH 2000.1-3, SMF 79415-18.

El Salvador: MORAZÁN: Corinto, La Cueva de Corinto, 863 m, 13°49.93'N, 88°57.59'W: SMF 79506, MUHNES 30-1223; 1-2 km N La Cueva de

Corinto: BMNH 2000.4, SMF 78507-09; Cerro El Aguacate: 1000-1010 m, 13°48'N, 87°57.6'W: BMNH 2000.5, MUHNES 30.1224-25, 30.1228, 30.1230, SMF 79510-11, 79514-15; Cerro El Junco, 880-900 m: BMNH 2000.6-7, MUHNES 30.1226-27, SMF 79512-13; Cacaopera, Río Torola, Cantón Calavera: MUHNES C361; LA UNIÓN: 8 km E El Sauce, 100 m: MUHNES 30.1229; Isla Conchaguita: MUHNES C-390; SANTA ANA: Metapán, 1 km S Casas de Teja: MUHNES 30.1232; SAN VICENTE: 1 km W San Ildefonso, 210 m: MUHNES 30.1231.

Ctenosaura quinquecarinata

México: OAXACA: Mixtequilla, 120 m: MZFC 12441-42, 12445-47; 8 km N of Mixtequilla: SMF 75704-06; Niltepec, 120 m: MZFC 12436-40; Nisanda, Municipio Asunción Isaltepec, 1 km NE Ejido de Mena Nisanda, 90-125 m: MZFC 12435, 12443-44, 12469-70; "Oaxaca": BMNH

1871.11.24.2; Salina Cruz: BMNH 1903.9.30.29; 10 km N Salina Cruz: SMF 75709; Tehuantepec: BMNH 90.10.10.33, SMF 43259; Tequesixtlan, Tehuantepec: BMNH 1903.9.30.20-21; unknown locality, BMNH 41.3.5.61, 1946.8.30.48 (holotype of *C. quinquecarinata*).

Nicaragua: BOACO: Haciendo Viejo (near Teustepe), La Guegue, ca. 3 km W. 290 m, 12°25.65'N, 85°53.31'W: SMF 79521; 5 km N La Cruz de Teustepe, 120 m: SMF 77707-10; vicinity of La Cruz de Teustepe, 120-150 m: AMNH 77707-77710, SMF 79522-24, 79530-33; El Consuelo, ca. 2 km W Hazienda Viejo (near Teustepe), 280 m: SMF 79522; ESTELÍ: 1 km E San Francisco del Norte, 284 m, 13°11.87'N, 86°44.23'W: SMF 79526; 6 km E San Francisco del Norte, 330 m, 13°10.85'N, 86°40.20'W: SMF 79527-29; MANAGUA: km 56 on highway to Rama: KU 174062-64; JINOTEGA: near Jinotega: KU 174065.

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