

SHORT REPORT

Describing Archaeological *Iguana* Laurenti, 1768 (Squamata: Iguanidae) Populations: Size and Skeletal Maturity

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ABSTRACT The goal of this study was to provide tools to estimate size and maturity of the archaeological *Iguana* specimens on the basis of their skeletal remains. To achieve this, a reference of 40 *Iguana* osteological specimens from different collections was used to derive size prediction equations relying on bone measurements. The sequence of fusions of skeletal elements was also observed and found to be strictly identical in all observed specimens. These observations enable the size and skeletal maturity of an archaeological specimen to be determined on the basis of an isolated bone. Such data could be valuable in zooarchaeological studies, as is demonstrated using the case of a pre-Columbian archaeological site in the Lesser Antilles. Copyright © 2015 John Wiley & Sons, Ltd.

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Introduction

Estimating the biological characteristics of animal archaeological populations is crucial to understand the interactions between past human and animal communities. In zooarchaeological studies, such characteristics are mainly approached by the bias of the age and size of the exploited animals. This allows a better understanding of the subsistence economy and cultural behaviours of past human groups. Consequently, many studies have been performed in order to determine the size and age of archaeological populations of many taxa from domestic to wild species (lit. rev. in Reitz & Wing, 2008). But no reference exists to study the archaeological assemblages of squamates, probably because they are mostly small animals of low importance in past human diets. However, this becomes less true in tropical regions where these animals

can be of large size and represent a significant part of the faunal assemblages. Therefore, studies dealing with the age and size characterisation of these animals are needed for a better understanding of the economy of past human populations of these regions.

The overall goal of this study is to provide methodological tools allowing biological characterisation of archaeological populations of one of the most well-represented lizard genera in archaeological deposits from Central and South America, the genus *Iguana* Laurenti, 1768. This currently includes two species: the mainland green iguana [*Iguana iguana* (Linnaeus, 1758)] and the Lesser Antillean iguana [*Iguana delicatissima* (Laurenti, 1768)], which can crossbreed to produce fertile hybrids (Breuil, 2002, 2013; Stephen *et al.*, 2013). This study focuses on two of the biological variables that can be investigated using bones: body size and skeletal maturity. The first objective is to provide a method to estimate the size of archaeological *Iguana*. Thus, equations to predict the size of archaeological iguanas are constructed using a comparative sample of modern *Iguana* specimens from museum

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collections. The second objective is to provide a tool to determine the skeletal maturity of the archaeological specimens. The skeletal maturity of modern specimens is observed to achieve this goal.

Material and methods

Fossil size estimation

A full set of 606 measurements (Figures S1–S5 of the Supporting Information) was taken on all comparative specimens. These measurements covered most of all the *Iguana* cranial and postcranial bones but anatomical parts that are often broken in fossil assemblages (premaxilla, palatine and basisphenoid) were excluded as were the limb extremities (carpus, tarsus, metapodials and phalanges). The measurements were taken using a digital dial calliper [IP 67 (Mitutoyo corporation, Japan)]. All the analyses were performed using the open-source statistics software R (R Core Team, 2013) and the R studio environment (RStudio, 2013).

The size estimation was produced using a linear equation exploiting the results of a linear regression between two variables. This method is often employed to predict the size of fossil organisms (Alberdi *et al.*, 1995; Campbell, 2014; Reitz & Wing, 2008). To describe the overall size of the iguanas, the snout–vent length (SVL), which is the variable commonly used in the literature to express squamate size, was used.

In the regressions, the explanatory variable (x) is an osteological measurement, and the dependent variable (y) is the SVL; both variables are expressed in millimetres. These variables were log transformed in order to make the simple allometric relationship between the variables linear (Huxley, 1932; Gould, 1966). The obtained equations were of the form:

$$\text{Log}(SVL \text{ in mm}) = (a) * \text{log}(\text{osteological measurement in mm}) + (b)$$

Because the equations were built with log-transformed variables, the predicted values have to be log reversed using an exponential function to obtain the predicted SVL in millimetres.

A modern sample of 29 iguanas of known SVL (Appendix 1) was used to construct the equations. Because of the scarcity of *Iguana* specimens of known size in museum collections and because it was necessary to derive equations in order to predict the size of all the members of the genus, specimens of the two *Iguana* species and some hybrids were included in the sample. The full set was composed of 15 *I. iguana*, eight *I. delicatissima*

and six hybrids. Because two species and hybrids were mixed in the sample, a cross-validation process was used to test if the specific heterogeneity of the sample could induce a bias in size estimations.

This process was performed by producing two sets of monospecific equations using separately the *I. iguana* and *I. delicatissima* modern samples. Then, the *I. iguana* equations were used to predict the size of *I. delicatissima* modern specimen of known size, and the *I. delicatissima* equations to predict the size of the *I. iguana* modern specimens of known size. Thus, variables that produced significantly different size estimations between the two species and so significantly different equations were tracked. Such equations reflect proportion differences between the two species and so the variables used to derive them cannot be used to produce equations mixing different species.

Skeletal maturity

Most squamate bones, just like those of many other vertebrates, have more than one ossification centre. This results in the formation of different bony parts connected by cartilage or membrane that fuse once the bone has reached its final size and so stops its growth (Haines, 1969). In this study, the patterns of bone fusions in *Iguana* specimens were observed in order to see if skeletal maturity stages could be defined.

The bone fusions observed were those of the occipital complex (supraoccipital, otooccipital, basioccipital, prootic and basisphenoid), atlas elements, axis odontoid process with axis centrum, centrum with neural arch of the vertebrae, first sacral vertebra with second sacral vertebra, scapula with coracoid, pelvic girdle (ilium, ischium and pubis), long bone diaphysis with their proximal and distal epiphyses, calcaneus with astragalus, and metapodials with their distal and proximal epiphyses. These fusions were observed in 39 complete modern *Iguana* skeletons (10 *I. delicatissima*, 22 *I. iguana* and seven hybrids) for which the fused or unfused condition of each bone could be clearly established (Appendix 1). Elements are considered as 'fused' when they cannot be physically separated anymore; this condition precedes the obliteration of sutures that are still visible in some of our 'fused' comparative bones.

Results

Size estimation equations

In order to select the most useful variable for size prediction, the previously described full set of measurements

was taken on all specimens. Then, linear regression was performed between all the log-transformed measurements and the log-transformed SVL of the modern specimens to obtain 606 equations. However, all these equations were not useful or reliable to estimate SVL, so amongst this large set of equations, the best variables had to be selected to produce a small set of reliable equations that could be easily used to obtain SVL estimation from an archaeological assemblage.

In order to achieve this goal, all the equations with an R^2 less than 0.94 were firstly discarded. This eliminated the osteological measurements that were weakly correlated with SVL as well as those that were subject to a significant measurement error. Secondly, all the

measurements corresponding to easily breakable structures that are poorly represented in archaeological assemblages were also discarded. Lastly, the cross-validation process described earlier was used to discard all equations presenting significant differences of size estimation for *I. iguana* and *I. delicatissima*. Such equations were arbitrarily considered to be those having a mean of SVL prediction error (in absolute value) greater than 25 mm.

These three steps reduced the set to 48 equations that seemed to be reliable for predicting *Iguana* size in fossil assemblages (Figure 1 and Table 1). For each equation, the mean and maximum error resulting from the cross-validation process is reported.

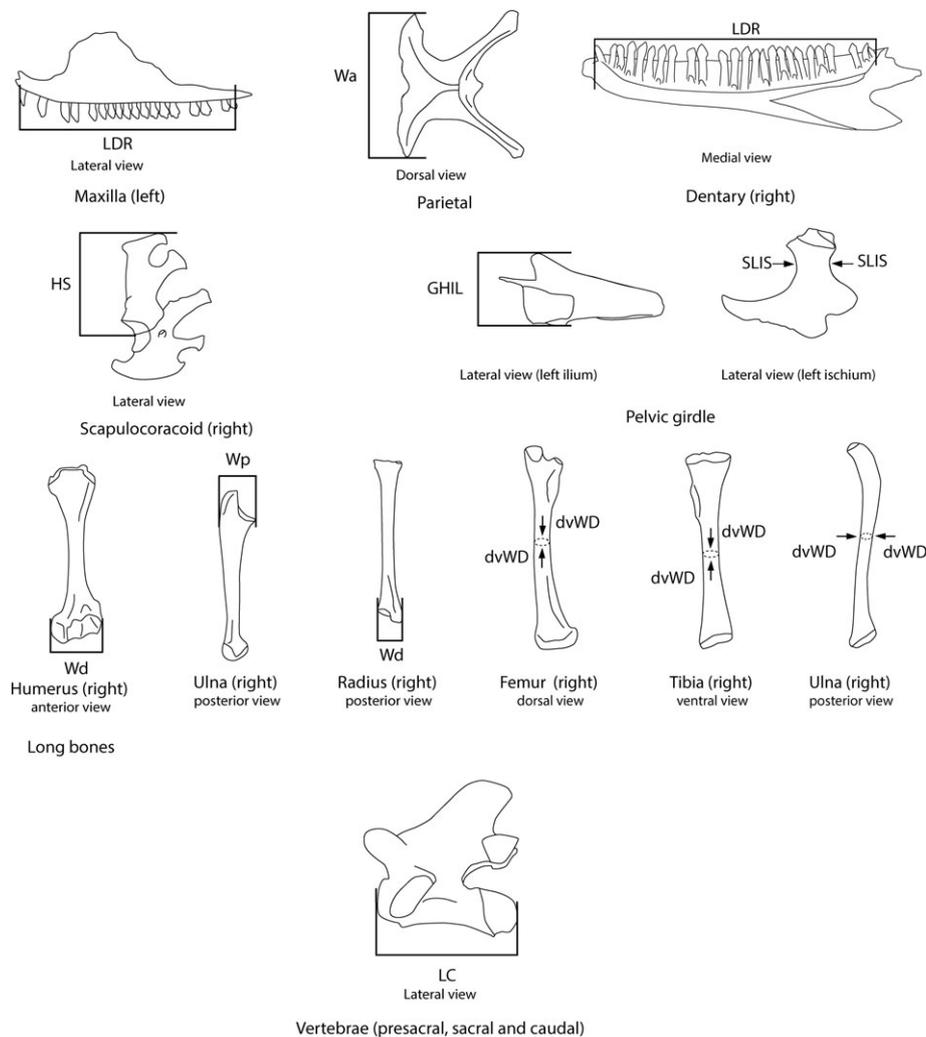


Figure 1. Measurements used in the 48 selected equations. Maxilla: LDR: (greatest) length of the dental row from the anterior extremity of the first tooth to the posterior extremity of the last tooth. Parietal: Wa: (greatest) width of the anterior margin of the bone. Dentary: DRL: dental row length from the anterior extremity of the first tooth to the posterior extremity of the last tooth. Scapulocoracoid: HS: height of the scapula from dorsal tip of the bone to posteroventral tip of the bone or suture with the coracoid. Pelvic girdle: GHIL: greatest height of the ilium. SLIS: smallest length of the ischium. Long bones: dvWD: dorso-ventral width of the mid-diaphysis. Wd: (greatest) width of the distal extremity of the bone (only on fully mature specimens). Wp: (greatest) width of the proximal extremity of the bone (only on fully mature specimens). Vertebrae: LC: (greatest) length of the centrum.

Table 1. Selected equations with their slope (a), Y-intercept (b), R^2 and the mean and maximum prediction errors observed from the cross-validation process

Bone	Measurement	a	b	R^2	Mean error in absolute value (mm)	Max. err. (mm)
Maxillary	LDR	1.036	2.284	0.95	19.42	66
Parietal	Wa	1.189	2.053	0.96	14.99	51
Dentary	LDR	1.083	2.082	0.95	22.15	64
Scapula	HS	0.906	3.017	0.97	13.16	56
Ilium	GHIL	1.001	3.099	0.97	17.09	71
Ischium	SLIS	1.027	3.830	0.96	19.42	63
Humerus	Wd	0.868	3.494	0.96	16.38	65
Ulna	Wp	0.872	3.936	0.98	15.72	49
Radius	Wd	0.896	4.278	0.97	19.50	68
Femur	dvWD	0.859	4.344	0.95	17.27	87
Tibia	dvWD	0.925	4.460	0.96	19.27	58
Fibula	dvWD	0.856	4.868	0.98	15.30	58
1st sacral vertebra	LC	0.942	3.680	0.98	13.42	28
2nd sacral vertebra	LC	0.942	3.614	0.96	13.09	35
1st caudal vertebra	LC	0.951	3.580	0.97	15.83	36
2nd caudal vertebra	LC	0.944	3.508	0.97	14.59	31
3rd caudal vertebra	LC	0.952	3.423	0.98	13.78	35
4th caudal vertebra	LC	0.937	3.427	0.98	11.33	35
5th caudal vertebra	LC	0.923	3.438	0.98	11.40	37
6th caudal vertebra	LC	0.936	3.404	0.98	10.93	46
7th caudal vertebra	LC	0.941	3.381	0.97	12.47	48
8th caudal vertebra	LC	0.892	3.482	0.97	12.29	48
9th caudal vertebra	LC	0.897	3.456	0.97	12.26	47
10th caudal vertebra	LC	0.888	3.463	0.97	11.94	48
11th caudal vertebra	LC	0.898	3.417	0.97	12.37	53
12th caudal vertebra	LC	0.885	3.435	0.96	14.69	58
3rd dorsal vertebra	LC	0.913	3.712	0.98	11.75	28
4th dorsal vertebra	LC	0.938	3.671	0.98	11.97	35
5th dorsal vertebra	LC	0.953	3.663	0.98	13.07	35
6th dorsal vertebra	LC	0.978	3.592	0.99	9.53	24
7th dorsal vertebra	LC	0.975	3.562	0.98	11.66	31
8th dorsal vertebra	LC	0.968	3.499	0.98	11.37	29
9th dorsal vertebra	LC	0.971	3.424	0.98	11.30	28
10th dorsal vertebra	LC	0.949	3.435	0.98	12.43	36
11th dorsal vertebra	LC	0.959	3.367	0.98	12.75	34
12th dorsal vertebra	LC	0.973	3.296	0.98	13.09	31
13th dorsal vertebra	LC	0.974	3.274	0.98	12.15	34
14th dorsal vertebra	LC	0.942	3.338	0.98	12.51	33
15th dorsal vertebra	LC	0.982	3.208	0.96	15.04	38
16th dorsal vertebra	LC	0.973	3.199	0.98	13.30	37
17th dorsal vertebra	LC	0.971	3.201	0.98	12.54	41
18th dorsal vertebra	LC	0.956	3.243	0.98	11.58	32
19th dorsal vertebra	LC	0.950	3.273	0.98	12.26	40
20th dorsal vertebra	LC	0.925	3.356	0.97	12.19	34
21th dorsal vertebra	LC	0.936	3.355	0.98	10.33	37
22nd dorsal vertebra	LC	0.937	3.429	0.97	12.06	46
23rd dorsal vertebra	LC	1.000	3.350	0.96	15.22	51
24th dorsal vertebra	LC	0.977	3.522	0.96	20.28	49

Skeletal maturity

Observations of the *Iguana* skeletons showed a strict sequence of bone fusions. However, because of the small size of the sample and because the sequence was unclear for some bones, these fusions were grouped into different maturity stages from the earliest fusions (stage 1) to the latest fusions (stage 4) (Figure 2).

At stage zero, none of the observed bones are fused. At the first stage, centra of the dorsal vertebrae fuse with

their neural arch. At the second stage, the astragalus fuses with the calcaneum, the scapula fuses with the coracoid, and all the occipital bones fuse together. At the third stage, the axis centrum fuses with the axis odontoid process, and the pelvic girdle bones (ilium, ischium and pubis) fuse together. At the fourth stage, the long bones (diaphysis with epiphysis) fuse, as do the atlas elements. Some additional fusions can also occur later, like the fusion of the two centra of sacral vertebrae and the atlas elements. The fusion of the metapodials appeared to be a

	Dorsal vertebrae	Tarsus	Scapulocoracoid	Occipital complex	Axis	Pelvic girdle	Long bones	Sacral vertebrae	Atlas	Metapodials
Stage 0										
Stage 1	■									■
Stage 2	■	■								■
Stage 3	■	■	■		■	■				■
Stage 4	■	■	■	■	■	■	■	■	■	■

Unfused
 Partially fused
 Fused

Figure 2. Skeletal maturity stages observed.

slow process, beginning at stage 1 and becoming fully complete in stage 4. No difference in the fusion sequences was observed amongst the two *Iguana* species and the hybrids.

The lack of available information about the age of the specimens did not allowed the establishment of a link between the skeletal maturity and the age of the iguanas. However, some observations could be made about the links between size and maturity stages. These two variables were moderately positively correlated (linear regression; $R^2 = 0.46$; $p < 0.05$) if all the *Iguana* species are included in the same analysis. This correlation should probably be stronger because skeletal maturity is undoubtedly linked with specimen growth. Still, the fact that the sample comprises different species and sexes in an insufficient number to analyse them separately probably prevents the recognition of a stronger correlation. Yet, it is worth mentioning that stage 0 was only observed on a very young specimen around 8 cm of SVL. The other stages are more difficult to link with precise size, but we observed that the general epiphyseal fusion of skeletal elements begins with stage 1 at a size of about 30 cm of SVL.

Discussion

Forty-eight size estimation equations (Figure 1 and Table 1) were obtained, most of them derived from vertebral centrum length. These equations allow a reliable prediction of the specimen SVL using a single bone but have to be carefully used. Firstly, the remains have to be reliably identified as *Iguana* because the equations do not fit any other iguanid genus. Secondly, for all the equations built on vertebra ranks, the rank of the archaeological vertebra has to be accurately estimated with a comparative specimen because even if the equations are robust to a small identification error of one or two ranks, a larger error could lead to an inaccurate SVL estimate. Thirdly, extreme estimates, especially those exceeding the SVL of the specimens used to derive the equations, should be treated with caution. Fourthly, because the size estimate can be obtained from several anatomical parts (48), the size of a single archaeological specimen can be estimated many

times in the same assemblage. In order to avoid this problem without losing any information, the minimal number of individual (MNI) (Lyman, 2008) should be signalled every time in all sets of size estimations. In addition, the equations were only derived for *Iguana* specimens from the Lesser Antilles. Hence, an assessment of their applicability to mainland *Iguana* was not possible. However, these equations were found to be applicable to the two *Iguana* species, and so it is likely that they could also be applied to all *Iguana* despite the geographic variability of *I. iguana*. Moreover, the *I. iguana* specimens used in this study mostly come from La Martinique where *I. iguana* have been recently introduced from both Central and South America (Breuil, 2013).

The observations of the bone fusions of the *Iguana* specimens allow the definition of five skeletal maturity stages (Figure 2). The observed sequence of bone fusions matches the previous study of Maisano (2002) of *Dipsosaurus dorsalis* and could be common to all Iguanidae. In addition, Maisano (2002) also observed the link between skeletal maturity, sexual maturity and percentage of the maximum size reached by the specimen. These observations show that a specimen belonging to stage 2 is sexually mature and reached at least 38% of its maximum size, a specimen belonging to stage 3 reached at least 54% of its maximum size, and a specimen belonging to stage 4 reached at least 80% of its maximum size. Thereby, data concerning skeletal and sexual maturity can be obtained by using a single bone of the specimen.

Such information, as we will demonstrate now, becomes even more interesting when combined with size estimation equations because it enables the investigation of size at sexual maturity and maximum size and gives clues to understanding the population size structure and, therefore, the human exploitation strategies as well as the body size characteristics of the exploited population.

The case study of Petite Rivière site

In order to show how this methodology could be used in a zooarchaeological study, the case of the *Iguana* remains collected in the pre-Columbian Petite Rivière

habitat site (De Waall, 1995, 2006) on La Désirade Island was examined. The faunal remains collected in this site were previously studied by Grouard (2001), who showed that this material was dominated by marine resources (98% – 33 808 remains) and only contained a small number of *Iguana* remains ($N = 142$) for an MNI of 7 (based on the most common bone – right femora). Besides being relatively scant, these remains were also highly fragmented, excluding some phalanges and metapodials, only four bones were unbroken.

The methodology described earlier was applied to this material. It allowed the obtainment of 31 SVL data points, 24 skeletal maturity data points and 10 combinations of SVL and skeletal maturity data on single bones (Table 2).

The SVL size data demonstrated that most of the *Iguana* remains collected at the site had an SVL size ranging from 300 to 400 mm with some other specimens between 250 to 300 mm and 300 to 350 mm (Table 2). Two higher values also indicated specimens of 462 and 501 mm of SVL, but such values had to be carefully considered following the recommendations discussed earlier: firstly, because they seemed aberrant in regard to the majority of the size estimations obtained; secondly, because they exceeded by far the size of the largest specimen used to derive the equations (421 mm). It would therefore be necessary to add additional data to clearly demonstrate that specimens of such sizes exist in the material.

Table 2. Archaeological Iguana remains from Petite Rivière site used to produce Snout-Vent Length estimations along with their sexual maturity data when it was recordable: +X indicates stages above X, and –X indicates stages below X; Ind. = indeterminate

Bone	Skeletal maturity stage	Measurement used	Measure (mm)	Estimated size (mm)
Scapula	+2	HS	28.3	502
Fibula	Ind.	dvWD	4.4	462
Tibia	4	dvWD	5.7	435
Femur	4	dvWD	7.3	422
6th caudal vertebra	Ind.	LC	16.8	422
12th caudal vertebra	Ind.	LC	19.1	422
12th caudal vertebra	Ind.	LC	18.5	410
Femur	Ind.	dvWD	7.0	408
Fibula	Ind.	dvWD	3.6	388
Tibia	4	dvWD	5.0	383
Femur	Ind.	dvWD	6.5	383
Femur	Ind.	dvWD	6.5	383
2nd sacral vertebra	Ind.	LC	11.8	380
Femur	Ind.	dvWD	6.3	375
3rd dorsal vertebra	+1	LC	11.3	374
18th dorsal vertebra	+1	LC	16.3	370
Femur	–4	dvWD	6.2	369
Femur	Ind.	dvWD	6.1	366
Femur	Ind.	dvWD	6.1	363
Ulna	–4	Wp	9.4	362
16th dorsal vertebra	+1	LC	15.8	359
3rd caudal vertebra	Ind.	LC	13.1	356
9th dorsal vertebra	+1	LC	12.1	345
Femur	–4	dvWD	5.7	342
Tibia	Ind.	dvWD	4.4	339
Femur	Ind.	dvWD	5.5	335
Femur	Ind.	dvWD	5.5	335
5th caudal vertebra	Ind.	LC	12.9	329
Tibia	Ind.	dvWD	4.2	328
24th dorsal vertebra	+1	LC	10.1	325
Tibia	Ind.	dvWD	4.2	325
Femur	–4	dvWD	5.3	321
Tibia	Ind.	dvWD	4.1	318
2nd caudal vertebra	Ind.	LC	10.4	304
Coxal	–2	GHIL	13.6	303
Femur	–4	dvWD	4.8	298
4th caudal vertebra	Ind.	LC	11.2	297
Tibia	Ind.	dvWD	3.8	295
19th dorsal vertebra	+1	LC	12.5	291
4th caudal vertebra	Ind.	LC	10.8	286
Tibia	Ind.	dvWD	3.5	277

In regard to the skeletal maturity data, three bones had reached the stage 4 ($MNI = 1$), seven were undoubtedly below it ($MNI = 4$), and at least one specimen had not even reached stage 2. The other data collected in the Petite Rivière material indicated specimens above stage 1 or 2 and therefore gave less accurate information. These data indicated that most of the specimens collected did not reach full skeletal maturity because they were killed before attaining it.

The data combining both size and skeletal maturity were highly informative and gave clues to understand the isolated observations. These data indicated that stage 4 specimens were bigger than 380 mm of SVL and non-fully mature specimens smaller than 360 mm of SVL. Consequently, considering that the immature individuals (in the case of bones that were only fused in stage 4 specimens –see above–) had reached at least 80% of their maximal size (see previous text and Maisano, 2002), their minimal theoretical maximal size (MTMS) can be calculated using the largest immature bone measured. In the case of Petite-Rivière iguanas, this MTMS should be around 460 mm SVL. These data also linked size and skeletal maturity by giving an interval of size for each stage (Figure 3). These connections highlight the concordance between all the observed sizes, mostly below 380 mm of SVL, and the fact that most of the skeletal maturity data indicated immature specimens.

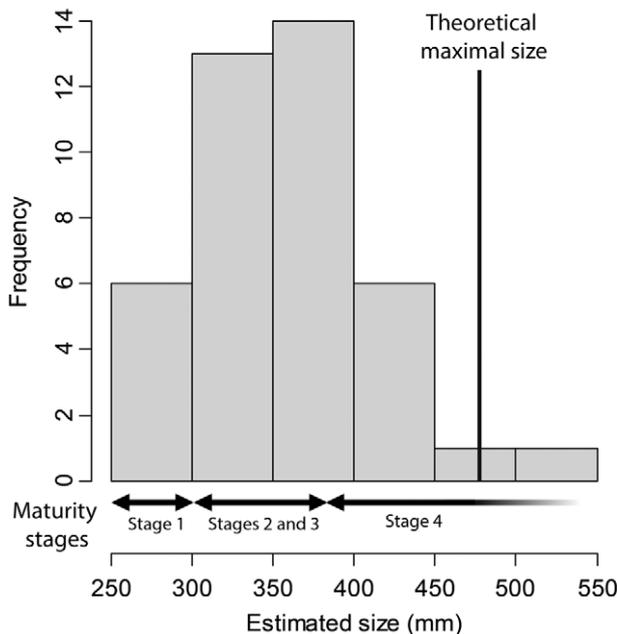


Figure 3. Distribution of the Iguana Snout-Vent Length estimations obtained in Petite Rivière site along with their correspondence with maturity stages and minimal theoretical maximal size.

These newly acquired data inform us about the exploitation strategies of the iguanas by the pre-Columbian hunters inhabiting the Petite Rivière site. The human selection focused on relatively large iguanas beyond 270 mm of SVL that represent a significant amount of meat. This fact suggests that the specimens were chosen by the hunters to be consumed. However, it also appears that this selection was not as strong as it could be. Indeed, although some very large specimens near the theoretical maximal size occurred on the site, they are rare in the material. These data are reinforced by the skeletal maturity data that show that most of the specimens did not finish their growth and that at least one specimen was not even sexually mature. This suggests the selection of large specimens without emphasis on searching for the largest ones. These data agreed with the interpretations of Grouard (2001), who discusses about an acquisition of the meat resources at the vicinity of the site. However, such data will only give their full potential if used to compare different sites and time periods to highlight differences of exploitation strategies. The use of the theoretical maximal size and size for each maturity stage, combining both size estimate and skeletal maturity, permits comparison of the size of different populations and avoids the bias linked to the age of the specimens. In our example, it is consequently possible to compare past iguana size with modern iguana size. In the specific case of La Désirade Island, the theoretical maximal archaeological *Iguana* size is far bigger than that of the biggest modern *Iguana* ever measured on the island that is only 387 mm of SVL (Schardt, 1998, cited in Breuil, 2002). Further investigations must be performed to discuss about the size evolution of these animals during the last millenaries because different species may have occurred in the Guadeloupe Islands (Lazell, 1973; Grouard, 2001; Breuil, 2002, 2013; Martin, 2009).

This short case study demonstrates that this method is applicable to archaeological bones and enables the maximisation of the utility of scant and fragmented material.

Conclusion

This work makes it possible to estimate the size and skeletal maturity of archaeological *Iguana* by giving a set of 48 reliable size prediction equations as well as skeletal maturity stages, both established on a broad number of comparative specimens. Such methodologies could be applied in a specie-specific manner to every squamate taxon found in archaeological context.

Still, much work must be performed to develop methodological tools for a better understanding of snakes and lizards in archaeological contexts.

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Supporting Information

Supporting information may be found in the online version of this article.

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Appendix 1

The following specimens were used to derive size estimation equations and to estimate skeletal maturity. We indicate for each specimen its SVL, sex, maturity, the place where it was collected, the name of the collector and the year it was collected (specimen N°/SVL/sex/maturity/origin/collector/date). Non-available information is signalled by NA. These specimens come from the Muséum national d'Histoire naturelle (MNHN – Paris, France) (Comparative Anatomy –MNHN-ZA-

AC-, Reptile and Amphibians –MNHN-RA- and UMR 7209 'Archéozoologie et Archéobotanique' 'Caraïbes' – MNHN-UMR7209- collections) and UMR 5199 CNRS 'PACEA' (PACEA – Bordeaux, France).

I. iguana

MNHN-UMR 7209-352/NA/NA/adult/Les Saintes: Terre-de-Bas/Vigne/1999; MNHN-UMR 7209-538/NA/NA/adult/Nicaragua/Grouard/2008; MNHN-UMR 7209-540/NA/NA/adult/Guadeloupe:Morel/Grouard/1995; MNHN-ZA-AC 2014-27/312mm/male/adult/Saint-Barthélemy/Breuil/2011; MNHN-ZA-AC 2014-28/273mm/female/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-29/289mm/male/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-30/NA/female/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-31/382mm/male/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-32/412mm/male/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-33/421mm/female/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-34/368mm/male/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-35/418mm/female/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-36/163mm/female/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-37/163mm/male/juvenile/Martinica/Breuil/2011; MNHN-ZA-AC 2014-38/230mm/female/juvenile/Martinica/Breuil/2011; MNHN-ZA-AC 2014-39/NA/female/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-40/NA/male/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-41/NA/NA/juvenile/Martinica/Breuil/2011; MNHN-ZA-AC 2014-42/130mm/male/adult/Martinica/Breuil/2011; MNHN-ZA-AC 2014-43/121mm/male/juvenile/Salvador/NA/2013; UMR 5199 010311A/255mm/NA/adult/Guadeloupe: Basse-Terre /Lenoble/2011; UMR

5199 150312A/350mm/female/adult/Guadeloupe: Grande-Terre/Lenoble/2012.

I. delicatissima

MNHN-UMR 7209-530/382mm/NA/adult/Guadeloupe: Basse-Terre/Moinecourt/2010; MNHN-ZA-AC 1941-215/335mm/NA/adult/NA/NA/1941; MNHN-ZA-AC 2014-20/375mm/male/adult/Saint-Barthélemy/Breuil/2011; MNHN-ZA-AC 2014-21/244mm/NA/juvenile/Saint-Barthélemy/Breuil/2011; MNHN-ZA-AC 2014-22/325mm/female/adult/Saint-Barthélemy/Breuil/2011; MNHN-ZA-AC 2014-23/373mm/female/adult/Saint-Barthélemy/Breuil/2011; MNHN-ZA-AC 2014-24/326mm/male/adult/Saint-Barthélemy/Breuil/2011; MNHN-ZA-AC 2014-25/NA/adult/La Désirade/Lenoble/2008; MNHN-ZA-AC 2014-26/298mm/female/adult/Saint-Barthélemy/Breuil/2011; UMR 5199 231111-B/NA/NA/juvenile/La Désirade/Lenoble/2011.

I. iguana X *I. delicatissima*

MNHN-ZA-AC 2014-13/336mm/female/adult/Saint-Barthélemy/Breuil/2011; MNHN-ZA-AC 2014-14/386mm/female/adult/Saint-Barthélemy/Breuil/2011; MNHN-ZA-AC 2014-15/382mm/female/adult/Saint-Barthélemy/Breuil/2011; MNHN-ZA-AC 2014-16/332mm/female/adult/Guadeloupe: Basse-Terre/Breuil/2011; MNHN-ZA-AC 2014-17/NA/female/adult/Guadeloupe: Basse-Terre/Breuil/2011; MNHN-ZA-AC 2014-18/396mm/female/adult/Saint-Barthélemy/Breuil/2011; MNHN-ZA-AC 2014-19/83mm/NA/juvenile/Saint-Barthélemy/Breuil/2011.