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Dog burials associated with Human burials in the West Indies during the early pre-Columbian Ceramic Age (500 BC-600 AD)

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ABSTRACT

Across the Caribbean, the widespread presence of canine remains at archaeological sites from the Saladoid period raises questions about the role of “man’s best friend.” Dog (*Canis familiaris*) remains have been found located in both refuse middens and burials adjacent to human graves in a number of sites in the French Antilles and Barbuda, West Indies. This paper will critically examine dog remains and discuss the varied duality of the dog’s role in the Saladoid world: from food source to lifelong companion. The importance of dogs within Amerindian sites from Saint Martin, the Guadeloupe archipelago, Martinique and Barbuda will be explored from a zooarchaeological perspective, concluding with a critical discussion of changes in cultural patterns, as seen through the decline in dog remains during the Troumassoid and Suazoid period at the sites in the French Antilles.

KEY WORDS

Lesser Antilles,
dog’s burial,
morphology,
saladoid,
Pre-Columbian.

RÉSUMÉ

Sépultures de chiens associées à des sépultures humaines dans les Petites Antilles à l'Âge du Néoindien ancien (500 av. – 600 ap. J.-C.).

Dans les Antilles, la présence généralisée de restes de chiens sur les sites de la période céramique ancienne Saladoïde soulève des questions sur le rôle de ce « meilleur ami de l'homme ». En effet, des chiens (*Canis familiaris*) ont été trouvés aussi bien dans des zones de rejets, qu'enterrés aux côtés de sépultures humaines dans un certain nombre de sites des Petites Antilles. Ce document examinera ces restes de chiens de façon critique et décrira les morphologies particulières des chiens des sites amérindiens de l'île de Saint-Martin, l'archipel de la Guadeloupe, la Martinique et de l'île de Barbuda, dans une perspective archéozoologique. Une discussion critique portera sur l'évolution des changements des modèles culturels, comme celui de la chute drastique des chiens enterrés pendant les périodes archéologiques plus tardives, Troumassoïde et Suazoïde, des sites des Antilles françaises. Enfin, la discussion portera sur la dualité du rôle du chien dans le monde Saladoïde, à la fois source de nourriture et compagnon de vie.

MOTS CLÉS

Petites Antilles,
tombe de chien,
morphologie,
saladoïde,
précolombien.

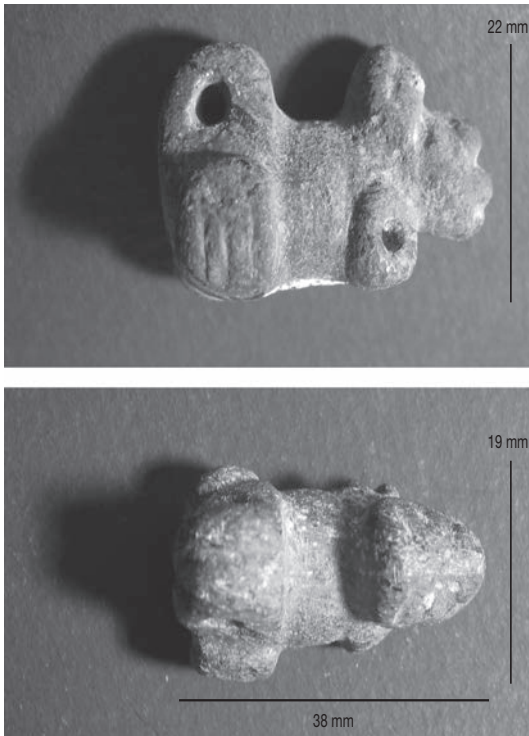


FIG. 1. — Dog pendant made of wood found at the Morel site (collection Edgar Clerc Museum / Conseil Général de Guadeloupe).

INTRODUCTION

MAN'S BEST FRIEND OR MAN'S BEST MEAL?

Man and dog (*Canis familiaris*) share a special bond which transcends life and death and is exhibited in many cultures. For example, the hairless dog of Mexico is called Xoloitzcuintle – Xolo for short, makes reference to Xolotl, the god of death. It was believed that the dog's mission was to accompany the dead on their journey to the afterlife (Valadez Azua & Mestre 1999). However, the prestigious position of the Xolo dog in society did not rule out a second use of this animal as a secondary food resource. In the case of the Xolo dog of Mexico this dual role is evident in the archaeological record (Valadez Azua *et al.* 1998; Valadez Azua & Mestre 1999; Valadez & Mendoza 2005), and because dog's remains are relatively common elements in archaeological sites of Mexico and Central America (Guzman 2010).

Similarly to this pattern, during the Caribbean Saladoïd period (also called the early neo-Indian Age or Early Ceramic Age), dog remains appear to suggest that they were both a ritual animal and part of the local diet (Newsom & Wing 2004). In general, a metric study on the dog remains shows correlations between smaller statured dogs being used



FIG. 2. — Ceramic zoomorphic adorno depicting a dog from the Early Saladoid level of Vivé Le Lorrain (BC 500 - 350 AD), Collection Conseil Général de Martinique/ Musée Départemental d'Archéologie de Martinique, Donation Mario Mattioni) ©CG972/MDAP/J. Popincourt. Head-tail length (of the dog adorno) : 96 mm



FIG. 3. — Polished and incised *Canis familiaris* left lower canine from Gare Maritime de Basse-Terre, Guadeloupe (n°1861 US 1003 dec 1 G3), photo by Sandrine Grouard.

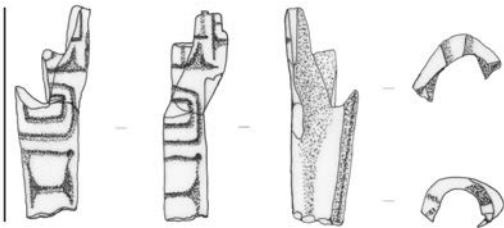


FIG. 4. — Carved tibia of dog (*Canis familiaris*) from Anse à la Gourde, Guadeloupe (Z64S64 AB1343 niv 2 1997), drawing by Sandrine Grouard 2001. Scale: 70 mm.

for food while larger dogs are buried in association with human graves (Grouard 2001).

Dogs are prominent in zoomorphic art from the French Antilles. Animal symbolism is very common in Caribbean sites and is exhibited in numerous zoomorphic pendants made out of wood (Petitjean Roget 1995) or carved out of precious imported stones (Fig. 1). Zoomorphic ceramic adornos (Fig. 2), carved bones (Figs 3 & 4), and canine pendants (Fig. 5) are also a common occurrence. At the Morel site, in Guadeloupe, an abundance of zoomorphic amulets were



FIG. 5. — Necklace found in a human burial at Morel (collection Edgar Clerc Museum / Conseil Général de Guadeloupe): (a) Frog in aventurine ; (b) Dog in chalcedony; (c) Broken Vulture or parrot in stictite, with amethyst and quartz beads. Scale bar: 40 mm.

unearthed from the human burials (Fig. 6), depicting stylized frogs, birds, jaguars, as well as dogs (Durand & Petitjean Roget 1991; Delpuech *et al.* 2002).

TABLE 1. – Frequency of dog remains as compared to those of other Mammals (NISP) in the French West Indies during the Early and the Late Ceramic Age Sites.

	Number of assemblages	NISP Vertebrata	NISP Mammalia	NfId Canidae	number of assemblages with dog remains	% Mammalia / Vertebrata	% Canidae / Mammalia	% Canidae / Vertebrata
Pre-Ceramic (2500 - 500 BC)	1	40						
Early Saladoïd (500 BC - 500 AD)	8	67107	13379	3146	8	19,9	23,5	4,7
Late Saladoïd (400 - 900 AD)	7	59811	6064	45	4	10,1	0,7	0,1
Early Troumassoid (600 - 1200 AD)	11	189532	4270	40	4	2,3	0,9	0,0
Late Troumassoid (1100 - 1500 AD)	11	72918	2660	18	1	3,6	0,7	0,0
Total	38	389408	26373	3249	17	6,8	12,3	0,8

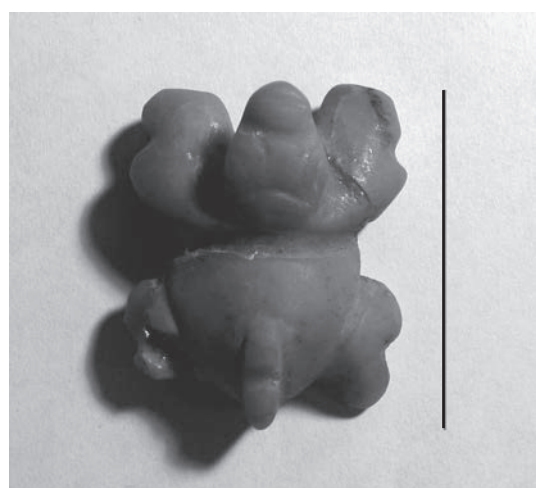


FIG. 6. – Dog pendant in chalcedony (collection Edgar Clerc: Museum / Conseil Général de Guadeloupe). Scale bar: 40 mm.

The dog therefore appears to be a type of totemic symbol of the pre-Columbian Early Saladoïd and a key component of the cultural traditions of the region. These stylized amulets are widespread in the Caribbean as well as Amazonia, which is to be expected given the connection between the peoples of the Caribbean with those of South America (Boomert 1987; Prous 1990).

PRESENCE OF DOGS IN THE CARIBBEAN DURING THE CERAMIC AGE

In addition to dogs being prominently depicted on objects of adornment, the skeletal remains of

dog are present in archaeological sites throughout the Caribbean (Wing 1989). A trademark of the Saladoïd culture, dogs are the earliest identified domesticated animals to be found in Amerindian sites in the region. The first pre-Columbian dog remains recorded in the French West Indies (Fig. 7) were associated with Huecan Saladoïd ceramics dating back to 500 BC.

Fourteen Saladoïd assemblages (500 BC-700 AD) from the French Antilles and Barbuda yielded dog remains in refuse middens or in burials, but only five Troumassoid assemblages (600-1500 AD) had dog remains. As seen in Figure 8 and Table 1, there is a distinctly high percentage of Canidae remains within the Mammal category in the early phases which gradually decreases through time: from 24.3% in the early and late Saladoïd levels (500 BC-800 AD) to 1.6% in the Early and late Troumassoid levels (600-1500 AD). Curiously, all of the Troumassoid dog remains were found in middens rather than associated with human burials. These sparse bones were always broken, some with cut marks indicating butchery while a few showed evidence of scorching (Fig. 9).

Dog remains have also been found in refuse middens showing evidence of consumption at sites like Trants in Montserrat (Reitz 1994; Dukes & Reitz 1995), Chancery Lane in Barbados, Grande Anse de Sainte Lucie (Wing 2008), Hope Estate in Saint-Martin, Gare Maritime de Basse-Terre, Cathédrale de Basse-Terre, Sainte-Rose la Ramée, Embouchure Rivière de Baillif in Basse-Terre, Anse

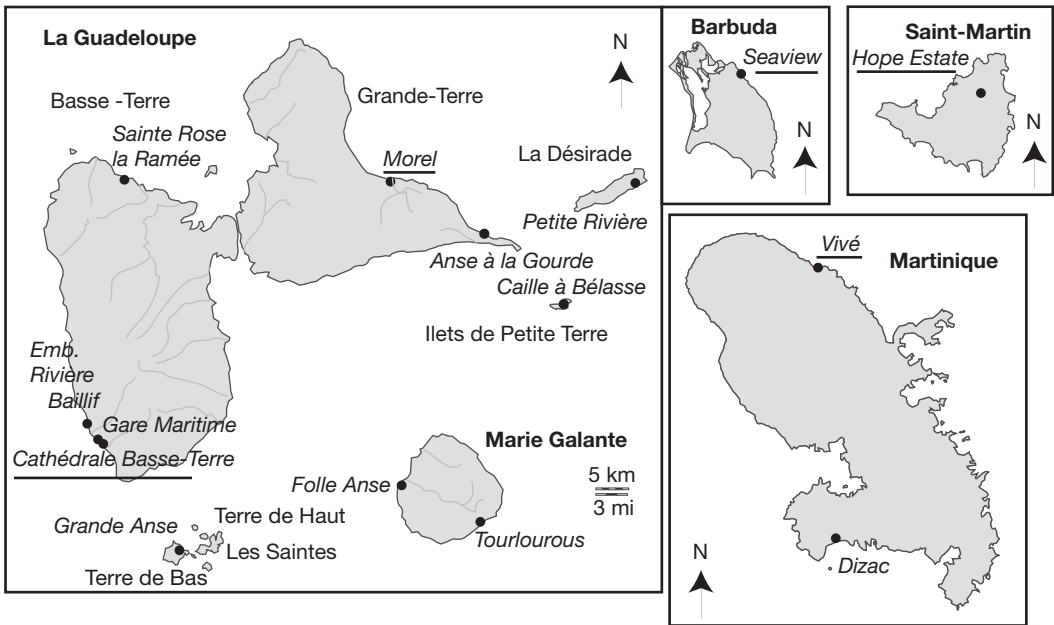


FIG. 7. – Map of the Caribbean, Saint Martin, Barbuda, Guadeloupe and Martinique with the location of sites with dog remains and dog burials.

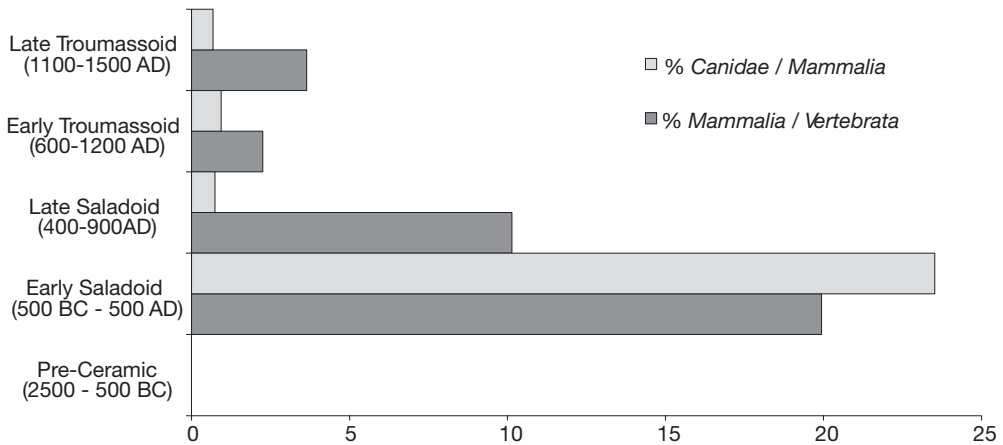


FIG. 8. – Frequency of dog remains as compared to those of other Mammals (NISP) in the French West Indies during the Early and the Late Ceramic Age Sites.

à la Gourde in Grande-Terre, Petite Rivière de la Désirade, Caille à Bélasse de Petite-Terre, Folle-Anse and Tourlourous in Marie-Galante, Grande Anse de Terre-de-Bas des Saintes, Dizac le Diamant in Martinique (Grouard 2001, 2004, 2010, 2011).

In Barbuda, the dog is the only mammal present at the Saladoid site of Seaview (Perdikaris et al. 2008). The examination of the midden material associated with the site showed that the archaeofauna consists primarily of mollusks, reptiles and some fish. The



FIG. 9. – Right mandible from a *Canis familiaris* exhibiting scorching on the alveolar surface of the canine and the premolars from Gare-Maritime de Basse-Terre (GMBT 1698 d us1008H2dec1), Early Saladoid level (500 BC – 700 AD).

Barbuda dog burials are found in the same cultural horizon as a human burial (Fig. 10). The dogs were buried to the north and the south of the human and show no marks of butchery.

DOG IN BURIALS AND DOG ASSOCIATED WITH HUMAN BURIALS

While it is well established that dog remains have been found in refuse middens, they have also been found in burials, and in some cases, in association with human burials.

In the West Indies, dogs in burials were found at the Saladoid sites of Hope Estate in Saint Martin (Grouard 2004), Morel de Grande Terre in Guadeloupe (Grouard 2001, 2010), Cathédrale de Basse-Terre in Guadeloupe (Bonnissant & Romon 2004), and Vivé in Martinique (Mattioni & Bullen 1974). The sites of Heywoods and Goddard in Barbados (Drewett 1991, 1993; Hackenberger 1991), and Trants in Montserrat (Petersen & Watters 1995) provided skeletons of dogs during the excavations, but they were excavated by bulldozers or they were not correlated with the pre-Colombian ceramic layers, and they could be historical or intrusive.

Dog burials directly associated with human burials were found in Morel Grande-Terre in Guadeloupe (Hoogland & Romon 1999; Hofman *et al.* 1999b; Grouard 2001, 2010), and Seaview in Barbuda (Perdikaris *et al.* 2008). The Silver Sands site in

Barbados had dismembered dog remains close to human burials (Drewett 1991; Wing 2008), but much of the site has been disturbed during historical times and the chronological relationships are not yet completed (Drewett 1991).

This phenomenon has also been reported in archaeological sites from the Greater Antilles, like Sorcé-Vieques with 22 dog burials (Narganes 1982, 1985; Wing 1991), Hacienda Grande (Walker 1985), Punta Candeloro, Tibes and Aguacate in Puerto Rico (Crespo 1991; Pérez Merced 2000; Rodríguez 2007), El Carril de Valverde, Ramon Santana de San Pedro de Macoris, La Caleta, Boca del Soco, and Cabo San Rafael in Hispaniola (Lawrence 1977; Calderón 1985; Rodríguez 2007), En Bas Saline in Haïti (Newsom 1995), Corrales de Ojo del Toro, Cueva Bélica, Cueva de los Perros, Cueva de Pío Domingo, and Birama in Cuba (Allen 1920; Fernández Ortega *et al.* 2006), and White Marl site in Jamaica (Wing 1972).

The dog burials across the region and in all chronological horizons show some distinct similarities as regards positioning (Fig. 11), as described previously by Narganes (1982), in the details of three dog burials from the Saladoid site of Sorcé on the island of Vieques, Puerto Rico: “They were buried complete with their legs pulled together, as if the four legs were tied with a rope, the tail was between the legs and the heads of both specimens YTA 3 (YTA 3 J 6 and YTA 3 I 5) were twisted and rested on top of the body” Wing (1991 : 380).

THE BURIALS AT MOREL

In Morel¹, 16 dog burials were excavated from the Huecan Saladoid and Cedrosan Saladoid level (Morel

1. The recent excavations of Morel were conducted by A. Delpuech, Conservateur Régional de l'Archéologie de Guadeloupe, C. Hofman, M. Hoogland and T. Hamburg from University of Leiden in 1993, 1995 and 1999. S. Grouard was invited on the 1995 field excavations, after the Marilyn hurricane. The burials from 1993, 1995 and 1999 were stored in the SRA of Basse-Terre, and in La Pastorale of the city Trois Rivières, and in the storage of the SRA in the city of Le Moule, before being studied in the MNHN laboratory in Paris in 2010. Special thanks to this team who allowed me to study the animals, and in particular to M. Delpuech for his financial support and help at this time.

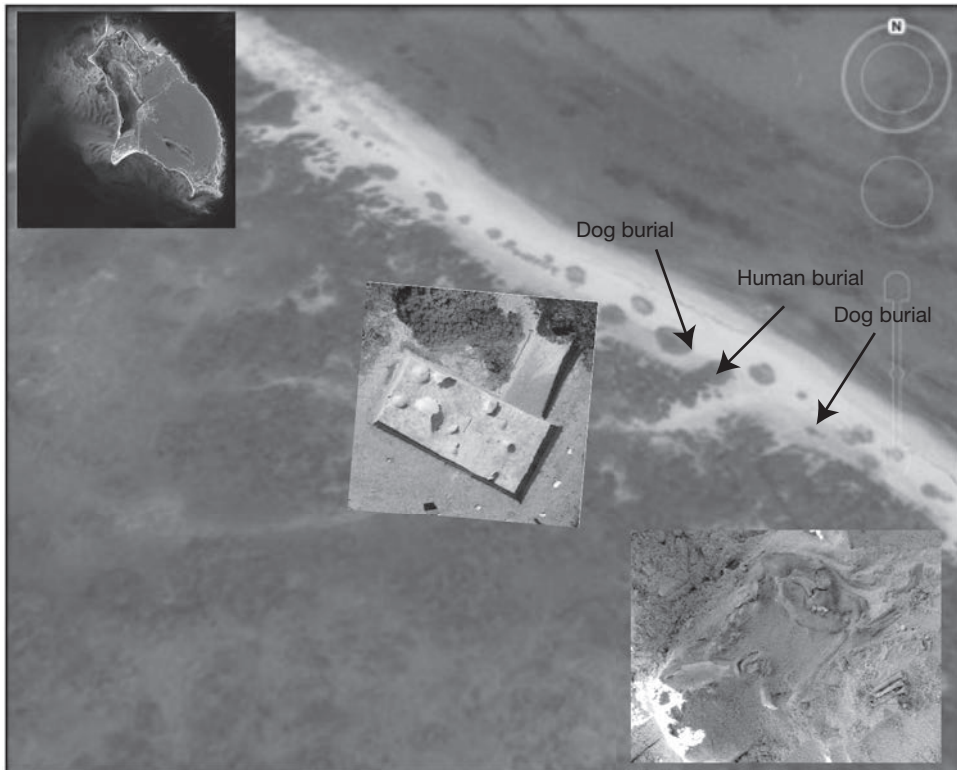


FIG. 10. – Dog burials from Seaview, Barbuda (picture S. Perdikaris, 2008).

I and II). The human and dog burials were placed between the postholes of large, round structures, malocas. One of the humans was placed side by side with four dog burials. One of the dogs had four shell beads around the neck, while another had a complete conch shell (*Strombus gigas*) placed on the pelvis.

The dogs from these burials were found lying on either the right or left side. The preservation was not optimal and most of the skeletons were missing the skull and parts of the distal ends. In addition, the bone surface showed evidence of acid erosion. The vertebral axis, the shoulder girdle and pelvic and long bones of the fore and hind legs were in better condition.

Three dog burials unearthed by E. Clerc in 1964 at the western side of the Morel site in level I/II (Clerc 1968), were located near human burials called « hommes de pierre ». Seven more dog burials were excavated in 1995 (Fig. 12) after a hurricane destroyed part the site (Hofman et al. 1999a). The

first burial (F200) was located at the center of the site but unfortunately the bone preservation was very poor and no positive species identification was possible. Near the burial, an excavated pit contained beads and ceramics (F201). To the west of the site, two pits (F202 and F203) contained two dog burials and a human burial (F204). In addition, the team unearthed one “en bloc” dog burial (F281) from unit 18 that was highly eroded. Two more dog burials of (F285 and F292) were unearthed from Units 17 and 19 respectively. The two human burials (F245 and F338) were excavated from Units 16 and 33 (Delpuech et al. 1995b; Hoogland & Romon 1999; Arts 1999). The two dates obtained from the human burials place them in the period called Saladoid with Barancoid influences (Morel II): 1700 ± 100 BP (cal AD 120-590) and 1770 ± 100 BP (cal AD 60 and 530) (Hofman et al. 1999a: 307).



FIG. 11. — Laboratory excavation of Morel F202 dog burial (© S. Grouard 1997).

In 1999, three human burials were excavated (F91-10, F91 and F90-01). All three were directly associated with dog burials, the first was located close to dog burial F90-11, the second next to dog burial F91-11 and the third had four dogs buried at the feet of the human skeleton, F90-01a, 01b, F90, F90 and F90-01c-16 (Hofman *et al.* 1999b).

One of the four dogs in the burial complex had four shell beads around its neck (Hoogland & Romon 1999). The dog in pit F90-16 had a conch shell (*Strombus gigas*) placed on top of the pelvis. The two human burials associated with this dog burial F91 and F90-01 contained ceramic vessels. The human burial F90-07 had four conch shells on either side of the shoulders and pelvis, and a cylindrical shell pearl behind the neck (Hoogland & Romon 1999).

Another burial from the Morel site, F91-01, a juvenile dog skeleton, did not seem to be associated with a human burial. This individual however,

was buried very close to the surface and was partly damaged by modern living activity in the area.

ANATOMY OF THE DOGS (SIZE, SHAPE, TEETH)

Size reconstruction – Withers Height (WH)

The analysis of the height at the withers {(WH; Koudelka 1885; Harcourt 1974; Clark 1995) - calculated from the total length (LT) of long bones} could be completed on sixteen pre-Columbian individuals from Cathédrale de Basse-Terre (CBT US5002), Gare Maritime (GMBT US1002/1003, GMBT US1008), Morel (F281, F90-01-1, F90-01-2, F90-01-3, F91-11, F90-16, Clerc 851, Clerc 1012), Seaview from Barbuda, and dogs burials from the Dominican Republic (after the measurements taken by Lawrence 1977 with the metrics from Haag 1948). The Withers height (calculated from Harcourt 1974) of the archaeological dog specimens, compared to a modern Whippet comparative specimen (Withers height=53.3 cm) shows that the modern dog was taller

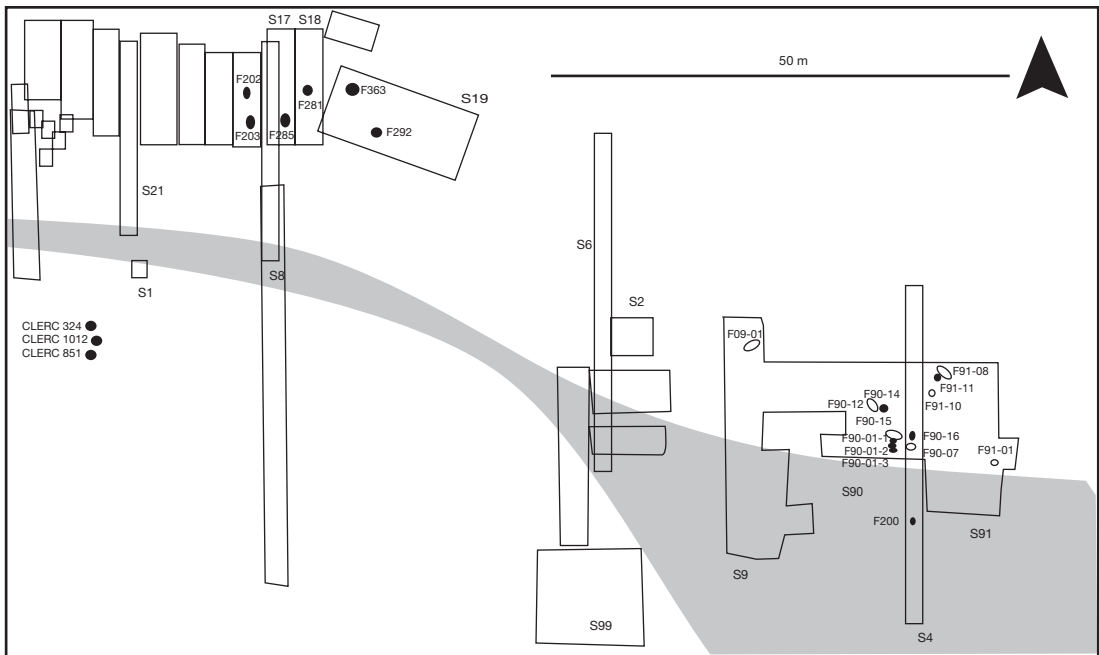


FIG. 12. — Map of the burials on the site of Morel with the dog burials (black spots), human burials (white spots) and palaeolaguna (modified from Grouard 2001 ; after Clerc 1968 ; Delpuech et al., 1995b ; Hoggland & Romon 1999)

TABLE 2. — Estimated height at withers (WH) from the total length (TL) of long bones of a comparative Whippet specimen (Anatomie comparée MNHN n° 1996-2468), pre-Columbian dogs from Basse-Terre (Cathédrale de Basse-Terre CBT US5002, Gare Maritime GMBT US1002/1003, GMBT US1008), MOREL (F90-01-1, F90-01-2, F90-01-3, F91-11, F90-16, F281, Clerc 851, Clerc 1012), Barbuda (Seaview), and burial dogs from the Dominican Republic (from Lawrence 1977).

Dog	minimum WH (mm)	maximum WH (mm)	Average WH (mm)
Lévrier "Whippet" 1996-2468	526	543	533
CBT US5002	422	434	428
GMBT US1002/1003	425	449	441
GMBT US1008	425	428	426
Basse-Terre	422	449	431
Morel 2727 F90-01-1	403	411	408
Morel 2731 F90-01-2	407	407	407
Morel 2730 F90-01-3	385	410	400
Morel 2728 F91-11	419	433	427
Morel 2729 F90-16	395	395	395
Morel F281	367	383	375
Morel 5237 CLERC 851-4-2	440	440	440
Morel 6263 CLERC 1012	395	395	395
Morel	367	441	409
Seaview Barbuda	411	480	452
Dominican Republic N°1	373	373	373
Dominican Republic N°2	359	361	360
Dominican Republic N°3	351	358	355
New Mexico Gobernador Site 41174	341	354	347
Dominican Republic	341	373	354

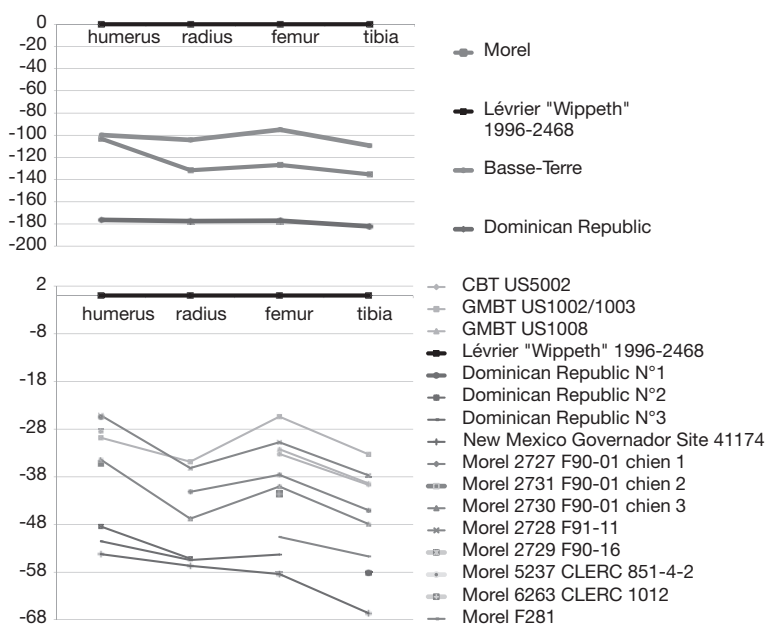


FIG. 13. — **A**, Estimated height at withers (WH) from the total length (TL) of long bones compared with a comparative Whippet specimen (Anatomie comparée MNHN n° 1996-2468), pre-Columbian dogs from Basse-Terre (Cathédrale de Basse-Terre CBT US5002, Gare Maritime GMBT US1002/1003, GMBT US1008), MOREL (F90-01-1, F90-01-2, F90-01-3, F91-11, F90-16, F281, Clerc 851, Clerc 1012), and Dominican Republic (from Lawrence 1977); **B**, Simpson diagram of the relative proportions of the different long bones, compared with a comparative Whippet specimen (Anatomie comparée MNHN n° 1996-2468).

than the pre-Columbian dogs from the Caribbean. The height for the archaeological specimens tested in this analysis, ranged between 34.1 cm and 48.0 cm, suggesting intra-population homogeneity in size.

As seen on Figure 13A and Table 2, the dogs from the Dominican Republic (35.4 cm) are dwarf, and the dogs from Morel Grande-Terre (40.9 cm) are small in stature. The individuals from Basse-Terre (Gare Maritime and Cathédrale de Basse-Terre) form a taller and homogeneous group within the graph (43.1 cm). The dogs from Seaview Barbuda are the tallest (45.2 cm after the metacarpals TL; Clark 1995).

The Simpson diagram of the relative proportions of the different long bones (Fig. 13A), compared with the comparative Whippet specimen, show that radius and tibia of the Guadeloupien dogs are 45 cm smaller than the Whippet, but the humerus and femur only 25 cm smaller. The distal long bones are shorter than the proximal long bones, like very small dogs, but not curved, like Teckels. The radius

and tibia of the Dominican dogs are 58 cm smaller, like the dwarf dogs.

GRACILITY INDEX (GI)

Much more than height, one of the defining characteristics of the canine species present is the level of robustness. When the gracility index (GI; Udrescu 1989 in Forest 1994) is calculated (total length / diaphysis width), the results range between 6.06 and 9.89, for pre-Columbian dogs. As for the Whippet reference specimen, the GI is around 6.5, which is a very gracile signature. The graphic representation yields roughly the same trend, with the three pre-Columbian individuals forming a more or less homogeneous group (7.7 in Basse-Terre and 7.8 in the Dominican Republic), while the Morel dogs seem to be more robust (8.30) (Tables 3; 4). More metrics on the long bones and mandibles and new indices (Belhaoues 2011) confirm the robustness of the dogs from Morel and Barbuda.

TABLE 3. — Diaphysis Index (SD/GL)*100 for the pre-Columbian individuals from Cathédrale de Basse-Terre (CBT), Gare Maritime (GMBT), Morel, Dominican Republic (after Lawrence 1977), and the Whippet reference collection (Anatomie comparée MNHN n° 1996-2468).

	humerus	radius	femur	tibia
Lévrier "Wippeth" 1996-2468	6,47	6,99	6,66	6,06
Morel 2727 F90-01 chien 1		9,86	9,33	8,27
Morel 2730 F90-01-chien 3	8,10	8,73	8,13	7,25
Morel 2728 F91-11	7,56	7,36	8,12	7,00
Morel 2729 F90-16			9,89	
Morel 5237 CLERC 851-4-2	7,63			
Morel 6263 CLERC 1012			8,19	
Morel F281			9,09	
CBT US 5002	9,10		8,18	7,49
GMBT US 1002/1003	7,21		7,99	6,89
GMBT US 1008			7,94	6,81
Dominican Republic n°1				7,22
Dominican Republic n°2	8,22	7,50		
Dominican Republic n°3	8,09	7,42	7,59	
New Mexico Governador Site 4114	7,83	8,08	8,83	6,98

TABLE 4. — Distribution of pre-Columbian individuals from Cathédrale de Basse-Terre and Gare Maritime de Basse-Terre (BT), Morel de Grande-Terre (MOR), Dominican Republic (DR) (after Lawrence 1977), and the Whippet reference collection (Anatomie comparée MNHN n° 1996-2468), according to the classification criteria of Udrescu (1989).

height at withers (WH)	Classe	Diaphysis Indice (SD/GL)		
		< 6,5 small	6,5 < 9 medium	> 9 large
< 30 cm	dwarf		DR	
30 < 40 cm	small			MOR
40 < 50 cm	small-medium		BT	
50 < 60 cm	medium	Whippet		
> 60 cm	large			

The metrics of the mandibles and teeth showed a dispersion of the dogs throughout the Caribbean and the sites (Fig. 14). For example, the measurements of the M_1 length and width, according to the Von Den Driesh measurements 13 and 13a of the mandible (Von Den Driesh 1976) show a very small-sized first group of dogs in the Dominican Republic (DR), a second slightly larger sized group in the Sainte Rose La Ramée from Guadeloupe (SRLR), a third middle-sized group of dogs representing all the Early Saladoid dogs from Morel (MOR), Cathédrale de Basse-Terre (CBT), Gare Maritime (GMBT) from Guadeloupe, and a middle-large group at Seaview from Barbuda and Gare Maritime.

The average weight of Morel dogs (Table 5) is 9.7 kilos (min 6.9 kg, max 11.7 kg). The average weight

from Basse-Terre is 9.9 kilos (min 4.6 kg, max 14.5 kg). Three dogs from Marie-Galante, la Désirade and Saint-Martin are 13 kg, but two dogs from Saint-Martin are 9 kg. The two dogs from Barbuda are 8.9 and 7.4 kg, and the average weight of the dogs from the Dominican Republic is 7 kilos (min 5.5 kg, max 8.4 kg). Other studies of dog bone material from the Caribbean have given similar body mass estimates. Thirteen animals studied and measured by Wing on Sorcé (1991: 382) have an average body mass of ~ 9.3 kg (range from ~ 7 kg to 10.6 kg), while an individual from Savanne Suazey in Grenada weighs ~ 7.6 kg. An individual from Cuba was estimated to be 9.7 kg (Wing 1991).

All of these dogs are light, but there are two groups of dogs: the weight of the animals found in burials

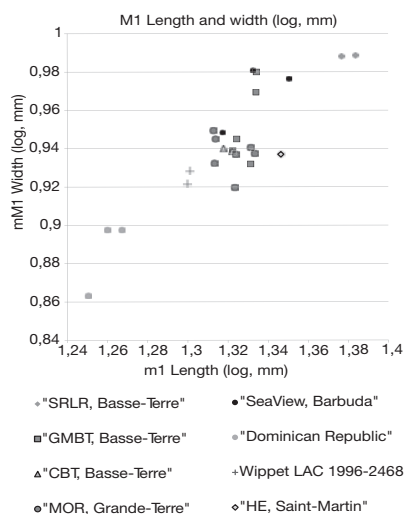


FIG. 14. — Length and width of M_1 (log, mm) for the dogs from Sainte-Rose la Ramée de Basse-Terre (SRLR), Gare Maritime de Basse-Terre (GBMT) Cathédrale de Basse-Terre CBT), Morel (MOR) de Grande-Terre, Seaview (Barbuda), Hope Estate from Saint-Martin, Dominican Republic (after Lawrence 1977) and the Whippet reference collection (Anatomie comparée MNHN n° 1996-2468).

is less than 10 kilos, and the weight of the others found in middens is around 14 kg.

DENTITION AND DENTAL WEAR

Although dental wear is not necessarily a reliable criterion since it depends on the eating habits of each animal and certain habits, such as biting and chewing hard materials, cross referencing information on dental eruption along with dental wear can help to better calibrate the age of the dogs in these burials. When examining fusion, dentition and dental wear (Fig. 15), all the buried dogs were found to be young adults between 6 months and 2 years of age, with complete final dentition and superficial wear of the cuspids (Gipson *et al.* 2000). Indeed, most dogs showed wear between stages A through C, while none indicated extensive stage D or E wear, according to Horard-Herbin 2000 dental wear.

One interesting pattern in all the dogs studied is the absence of the P_1 , M_3 , and especially the P_4 from the majority of the mandibles. The medullar canal was empty and the bone surface is regular and smooth.

TABLE 5. — Reconstruction of the body mass (in kilograms) from the measurements of femur, humerus and mandibula (Wing 1978; Anyonge 1993; Valadez Azua 1998; Betti *et al.* 2000; Gunzman 2010)

Island	site	mass (kg)
Basse-Terre	CBT 5002 I2/J2 d	9,655
	GBMT US 1001 dec2	6,524
	GBMT US 1002/1003	12,286
	GBMT US 1004	4,610
	GBMT US 1008	9,553
	ERB S-1 3-III	14,512
Grande-Terre	SRLR US 2000	12,324
	Morel 2307 CLERC 324-79-N3,75	9,980
	Morel 6263 CLERC 1012	9,783
	Morel 5237 CLERC 851-4-C2	11,767
	Morel F281	9,942
	Morel 2675 F203	10,563
	Morel 2736 F285	10,150
	Morel 5508 F363	8,559
	Morel 2727 F90-01 chien 1	10,027
	Morel 2731 F90-01 chien 2	10,776
	Morel 2730 F90-01 chien 3	8,863
	Morel 2733 F90-01	8,970
	Morel 2732 F90-14	6,954
	Morel 2729 F90-16	9,789
Morel 2728 F91-11	10,345	
Marie-Galante	Tourlourous MG ST 4 passe 1 m2 1/2 S n°750	12,349
	PR	13,966
La Désirade	HE 2305 B métapode fémur vertèbre	8,370
	HE 2512B (D)	9,217
	HE 2605B fémur scapula cote vert	14,183
Barbuda	Seaview BA016 10m-25m unit 2007 D	8,952
	Seaview BA016 A2 (857) D	7,472
Dominican Republic	Dominican Republic n°2	7,195
	MCZ 41173	5,565
	New Mexico Gobernador Site 4114	8,395
Whippet LAC 1996-2468	Whippet LAC 1996-2468	14,214

In the x-rays studied, the presence of a tooth earlier in the dog life was indicated but the area is empty at the time of death and only one dog specimen indicates the presence of a P_4 that was formed but never erupted (Fig. 16). While a cultural practice of tooth extraction, as proposed by Wing (2008), cannot be

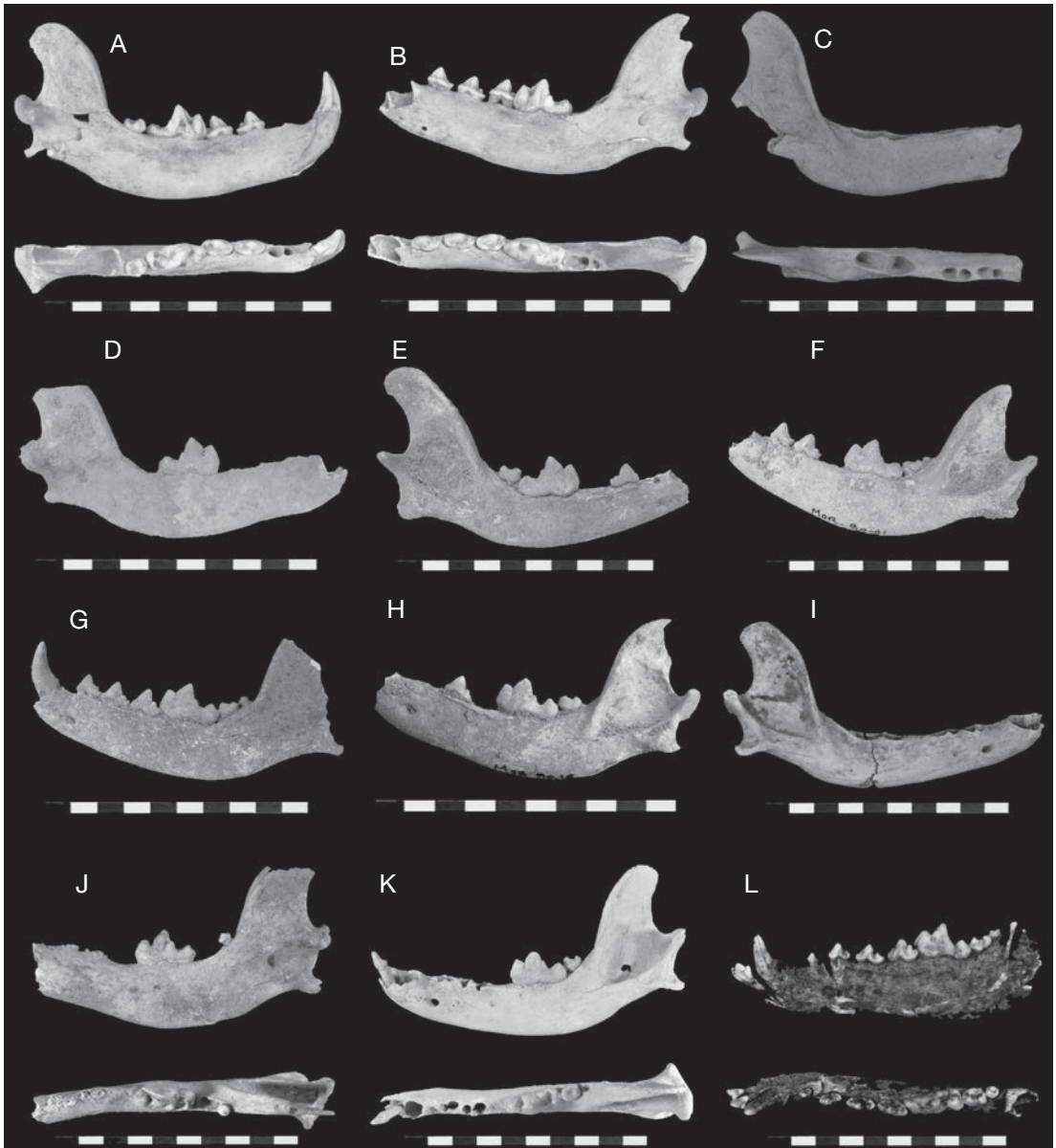


FIG. 15. — Dog mandibles from: (a) Cathédrale Basse Terre US5002 I2 right mandible, lingual and occlusal views, (a) Cathédrale Basse Terre US5002 I2 left mandible, lingual and occlusal views, (c) Gare Maritime US 1008 H2 right mandible, labial and occlusal views, (d) Morel F90-01-03 left mandible, lingual view, (e) Morel F90-01-02 right mandible, vestibular view, (f) Morel F90-01-02 left mandible, vestibular view, (g) Morel F91-11-02 left mandible, vestibular view, (h) Morel F90-16 left mandible, vestibular view, (i) Hope Estate US2512B square C, right mandible, vestibular view, (j) Seaview US857 left mandible, occlusal and vestibular views, (k) Seaview BAO16BAO16 left mandible, occlusal and vestibular views, (l) Historic Sainte Rose la Ramée US1078 left mandible, occlusal and vestibular views, (m) modern Dog from Aruba left mandible, occlusal and vestibular views (© K. Debue CNRS and S. Grouard).

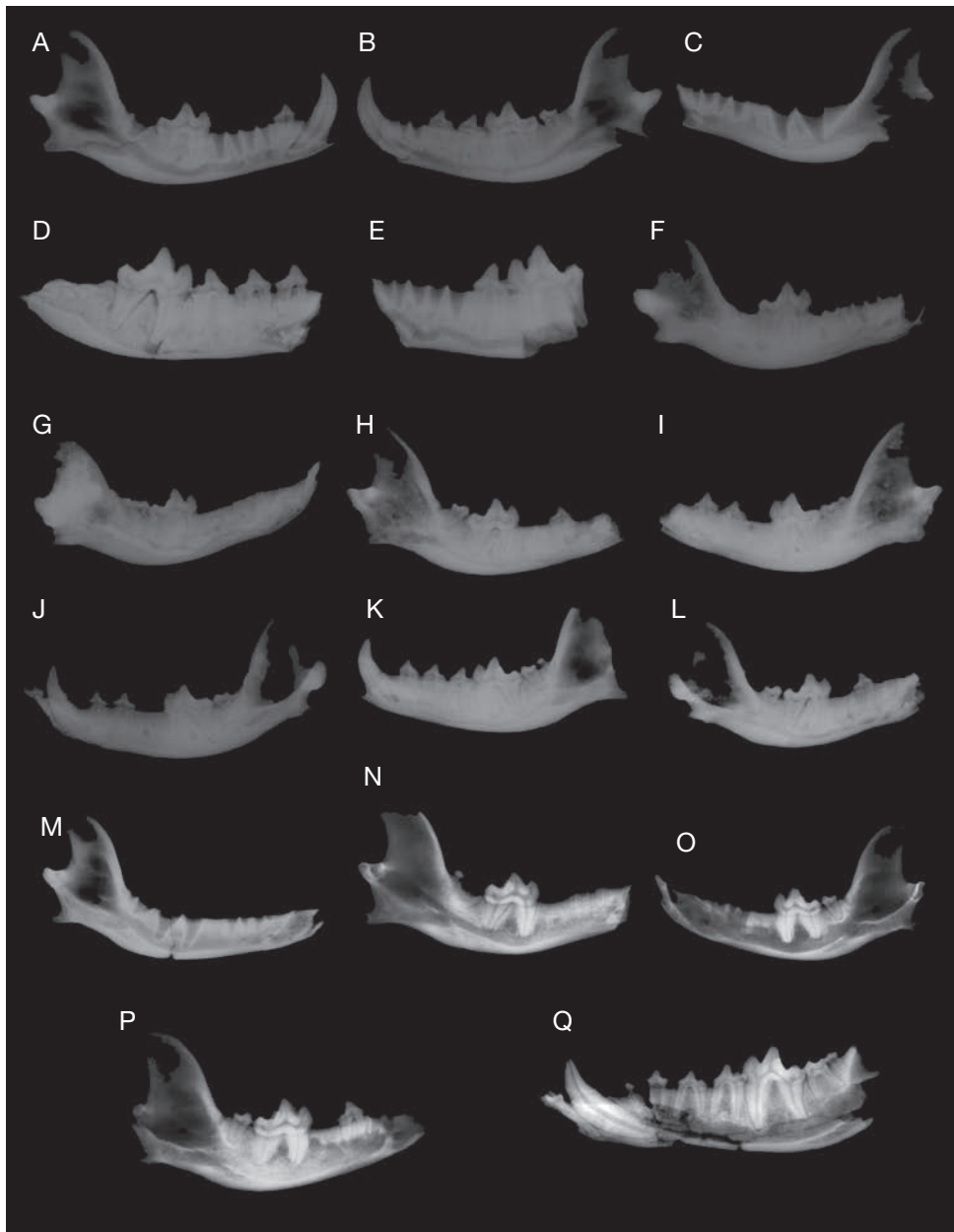


FIG. 16. — X-Rays of dog mandibles from: (a) Cathédrale de Basse-Terre US5002 I2 right, (b) Cathédrale de Basse-Terre US5002 I2 left, (c) Gare Maritime de Basse-Terre US1008 H2 right, (d) Gare Maritime US1001 J5 left, (e) Gare Maritime US1001 J5 right, (f) Morel 90 01 03 left, (g) Morel F90-01-03 right, (h) Morel F90-01-02 left, (i) Morel F90-01-02 right, (j) Morel F91-11 right, (k) Morel F91-11 left, (l) Morel F90-16 left, (m) Hope Estate US2512B-C right, (n) Barbuda Seaview US857 left, (o) Barbuda Seaview BAO16 left, (p) Barbuda Seaview BAO16 right, (q) Historic Sainte Rose la Ramée US1078 left (© Zora Gabisi MNHN and K. Debue CNRS)

ruled out, possibly to facilitate activities related to hunting, tracking and/or fishing, there is no evidence of forceful extraction of the teeth or any problems of loss due to tooth decay or excessive use by looking at the surface of the mandible. It actually appears that upon losing the milk teeth, the adult teeth never formed. While at the moment we are still presented with more questions than answers, a different cultural modification might be present in the dogs of the Saladoid period in the Caribbean – a modification resulting from the inter-breeding of genetic populations that carried desirable traits. At present, toothlessness is connected to an allele that is linked to breeds of dogs of the hairless variety (Casal et al. 1997). Many indigenous dog breeds from the Americas are hairless, like the Xoloitzcuintle (Mexican Hairless Dog or Perro Pelón Mexicano), a canine breed endemic to Central America dating back to pre-Columbian times, as well as the Peruvian Hairless Dog, that has origins in the Peruvian pre-Inca cultures.

In these breeds, as well as in the Chinese crested dogs, the genetic process of lacking hair is a combination of several genes and alleles. A phenotype termed canine ectodermal dysplasia (CED) is inherited as a monogenic autosomal semi-dominant trait (Casal et al. 2005). The collateral consequences of these genetic mutations are the lack of premolars and incisors. But, the most frequent tooth absences are the first two premolars, making the mandible appear with a long and robust diastema and the absence of a medullar canal (Lewis et al. 2010). While the archaeological dog remains from the Caribbean only share part of this patterning, the possibility of the presence of a dog related to the modern hairless varieties of the Continent is a very likely scenario. We are hoping in the near future to investigate this further and even possibly include a DNA approach to our understanding of this atypical dental patterning for the archaeological Saladoid dog remains from the Caribbean.

WHO WERE THESE DOGS ASSOCIATED WITH HUMAN BURIALS?

Finally, the ethnographic literature describes the Amazonian domestication of the dog to be very different from that of the European dog. The animals live in total freedom in the villages, eating from vessels made for human consumption or scavenging

in the trash. Some descriptions point to dogs being allowed to sleep in hammocks and sometimes being allowed to suckle lactating women. Emotional relationships or private ownership, common in Europe, did not exist (Snyder 1991; Roe 1995a).

“The presence of dog burials together with (human) Saladoid burials is possibly due to the watchdog conception not just as a canine (companion), but as a supernatural creature.’ This statement, along with the chronicles of the early settlers and the findings of supernatural Aboriginal art in the region, where it appears to represent the dog, allows us to affirm the important role (of dogs) in everyday life for the Aboriginal communities (translation from the original in Spanish) (Oliver 1999: 57).

According to Roe (1995b), some Venezuelan lowland shamans describe the jaguar as metaphorical “dogs”, while hunters employ real dogs to pursue jaguars, not for their meat, but for their pelt, teeth or claws. Additionally, dog remains from the pre-Columbian period in the mainland, are known by the same term as the “jaguar.” When the first Saladoid people entered the Antilles, the faunal diversity that they were used to from their mainland home was completely absent. Could then the dog have taken the conceptual place of a domestic “jaguar”? Zooarchaeological investigations in Santo Domingo unearthed a hollow effigy of a dog dating to the Cedrosan Saladoid. This find, along with a dog burial and assorted mortuary offerings of ceramic figures that served as “companions in eternity” to hunters and guides to the afterlife, provides further evidence of the importance of dogs in pre-Columbian cultures. The wealth of information on the symbolism of dogs in Lowland South American cultures from Guyana to the mountains strongly supports a hypothesis that dogs held a similar role in the West Indies. The dog, whether at home or transported elsewhere, represents one of the most potent symbols of Amazonian peoples and culture.

When the first Saladoid peoples arrived in the Caribbean, they brought with them two sizes of dogs. While the smaller dogs seem to have served as a handy food source for Amerindians, the amulets found with human burials in the Caribbean provide support for the “mythic substitution” of the dog for the jaguar. As a food source or a sacred companion, the dog

nourished the body, mind and spirit of the people with whom it came into contact. The archaeological evidence shows a duality of purpose ending with the same ritualistic outcome – a burial - accentuating the special relationship between dogs and humans.

CONCLUSIONS

In this paper we have attempted to provide a short review of archaeological finds from the French Antilles and Barbuda which attest to the dog's importance in the cultures of the region from BC 500- 700 AD. These dogs were small to dwarf, less than 14 kilos, with a height at the withers of less than 45 cm. However, two kinds of dogs were found: very small-dwarf in Morel, Guadeloupe and the Dominican Republic (5 to 10 kilos and 35-40 cm high), and small-medium in Basse-Terre de Guadeloupe, Marie-Galante, La Désirade, Saint-Martin and Barbuda (10 to 14 kilos and 43-45 cm high).

Moreover, a different cultural modification might be present in the dogs from the Saladoid period in the Caribbean – a modification resulting from the inter-breeding of genetic populations that carried desirable traits: the P_4 is absent from most of the mandibles. At present, toothlessness is connected to an allele linked to breeds of dogs of the hairless variety, like the Mexican hairless dogs, suggesting connections with Central America.

Dogs have clearly been an integral component of the hunting and gathering peoples that explored and colonized the islands at that time. Whether through the artistic representation seen on personal adornments or through its remains, the dog had multilevel connections to the lives of Amerindian people. A guide dog to the afterlife or a food source during life, the dog had a very special duality of purpose and occupied an important role in the identity of pre-Columbian peoples.

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