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MORPHOTYPES AND BREEDS OF DOGS (*Canis lupus familiaris* L.) FROM THE MOCHE PERIOD

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Abstract

Based on the pioneering studies of Tschudi, Nehring, Allen and Brothwell, iconographic representations, sculptures and some osteological evidence, information on the morphotypes and breeds of dogs that lived in pre-Hispanic Peru is provided, highlighting the two nuclear morphotypes: a primitive dog (hairless Peruvian dog) and a variety of dog (Chiribaya shepherd) that is a new haplotype to pre-Hispanic Peruvian dogs. The two dog morphotypes that lived in the Moche period are highlighted, as well as their role in the Moche society and the primitive hairless Peruvian dog, as the only primitive breed recognized by the International Cinological Federation for Peru.

Keys word: morphotype, breed, *Canis lupus familiaris,* Moche.

Resumen

En base a los estudios pioneros de Tschudi, Nehring, Allen y Brothwell, representaciones iconográficas, escultóricas y algunas pruebas osteológicas, se presenta información sobre los morfotipos y razas de perros que vivieron en el Perú prehispánico, destacándose dos morfotipos nucleares, una raza primitiva (*perro peruano sin pelo*) y una variedad de perro (*pastor Chiribaya*) que representa un nuevo haplotipo para los perros prehispánicos peruanos. Se destacan los dos morfotipos de perros que vivieron en la época Moche, su rol dentro de la sociedad Moche y la raza primitiva de *perro peruano sin pelo*, como la única raza primitiva reconocida por la Federación Cinológica Internacional para el Perú.

Palabras clave: morfotipo, raza, *Canis lupus familiaris*, Moche.

Introduction

There is a rich amount of evidence of domestic dog (*Canis lupus familiaris*) remains, which lived in pre-Hispanic times, in the archaeological sites of the Peruvian coast. Such evidences constitute complete individual burials in the case of cementeries, and some bones and bone fragments in some domestic contexts, indicating tight cultural relationships of the domestic dogs with the pre-Hispanic man.

Nevertheless, such important evidences have only being studied in isolated cases (Nehring, 1884, 1887; Allen, 1920; Weiss, 1976; Málaga, 1977; Brothwell et al, 1979) and in most of them the studies were carried out on recovered individuals from the central and southern coast of Peru.

To our knowledge, there are no studies so far about dog remains of the northern pre-Hispanic cultures of Peru; and in particular of the Moche culture, in which the representations and osteologic evidences discovered in relevant elite burials of this period allows to uncover more details of such canids.

From this perspective, and based on the sculptural and iconographic representations, as well as some osteological evidences of this canid, we review in this paper the dog morphotypes and breeds that lived in the Moche period, trying to illustrate the morphology and role of such dogs from the available evidences.

Morphotypes and Breeds

There are about 400 breeds of domestic dogs (Nowak, 1991), being the *Chihuahua* the smaller, and the *Irish wolfhound* the larger. The World Canine Organization (WCO), better known as FCI (from French, “Fédération Cynologique Internationale”) <http://www.fci.be> records 337 dog breeds, being each one acknowledged for the registering country. Such countries establish the standards for the inscribed breeds as a detailed description of the ideal breed type, in collaboration with the Standards and Scientific Commissions of the FCI. Such standards are the references taken into account by judges when evaluating dogs on expositions and contests carried out by FCI member countries.

A breed is considered an homogeneous and subspecific group of domestic animals, sharing defined and identifiable external characteristics, allowing to distinguish them by the naked eye from other defined groups of the same species, using the same parameters. Such homogeneity is obtained by means of the sexual isolation (usually geographic) with other phenotypically similar groups and by genetic drift, with a general agreement about such isolated identity (Turton, 1974).

There are currently many dog varieties grouped inside the breed concept. Each one of them has its own particularities based on physical characteristics, like hear length, color, size and other features like aptitudes; that is, the dog role for humans. Thus, there are, for instance, shepherd, guard

and defense, hunt, race, as well as pet dogs that have been created, selected and maintained for such purposes.

In this context, a dog breed or canine breed is a group of animals exhibiting similar features in relation to aspect, behavior, or both; mainly because they proceed from a select system of ancestors showing the same features. The dogs have been selectively mated for many years to generate specific characteristics. The original selection would have been centered on domestication and several useful behaviors (attitudes and aptitudes).

Regrettably, and although there is a large quantity of evidences corresponding to dog remains of the pre-Hispanic Peru that have been studied since the XIX century, only a single pre-Hispanic Peruvian dog breed has been recognized by the FCI. It is the hairless Peruvian dog (from Spanish, “perro peruano sin pelo”, also known as “perro viringo”, “perro chino” or “perro calato”).

This is due to the fact that, to obtain the certification of Peruvian canine breed by the FCI for a group of dogs from pre-Hispanic archaeological burials, a minimum number of animals showing similar characteristics must be found, in order to elaborate a racial pattern to be submitted as breed standard. Such requirements have not been fulfilled for the different dogs studied so far by Nehring (1884, 1887), Allen (1920) and Brothwell et al, (1979).

On the other hand, the mummified specimens, discovered in Ilo excavations by archaeologists of Centro Mallqui, are in track of being recognized as a second breed of pre-Hispanic Peruvian dog. Such possible breed is the Chiribaya shepherd (from Spanish, “pastor Chiribaya”), whose remains and excellent preservation condition has allowed to determine physical characteristics, like the kind of limbs and coat color, to establish identities with currently living dogs around Ilo (Meir, 2006).

Nevertheless, the expert Ermanno Maniero, International Judge for all breeds of the Peruvian Kennel Club and of the FCI since 1980, having obtained the worldwide recognition of the hairless Peruvian dog in 1985, was very cautious when analyzing the “*pastor Chiribaya*”, indicating that a long follow-up must be undertaken before confirming the existence of a native animal type.

On the other hand, the ancient DNA (aDNA) analyses, carried out by Leonard et al, (2002) on pre-Hispanic dogs from the United States of America, Mexico, Peru and Bolivia, indicate that one of the *Chiribaya* specimens conforms a new haplotype generated by geographical isolation, being other specimen a common haplotype, sharing a clade with Bolivia and Mexico specimens. These molecular data represent an interesting foundation to consider the Chiribaya dog as a new pre-Hispanic breed.

Brothwell et al, (1979), when studying the Peruvian aboriginal dogs, used the term morphotype for the studied individuals. A morphotype is an infrasubspecific group of animals, being distinguishable between them on the basis of morphological and morphometric characteristics, that can be associated to a change on their state, belonging to the same species.

In the case of the pre-Hispanic Peruvian dog remains, some studies have suggested the presence of a few groups separated by osteometric differences. Yet, they must be evaluated to determine the possible nuclear morphotypes, their variation range and to compare their measurements with pure breeds, so that more reliable data are generated about such pre-Hispanic dog remains. Regrettably, the measurements carried out by the experts have been isolated, scarce and only some of them can be compared to the measurements of Brothwell et al, (1979) for the central coast dog remains.

For all that, and taking into account the concept of breed and morphotype, the study of pre-Hispanic dog remains must take into account molecular and osteometric aspects, using comparative databases about dog measurements from neighboring geographical areas of the archaeological sites, which together with the availability of representative samples should allow to define nuclear morphotypes.

Morphological characteristics of the Pre-Hispanic Peruvian dogs

Dog burials dated from 1030 years BC to 1324 years AC have been found on the Peruvian coasts (Brothwell et al*,* 1979). A large part of the initial studies on the biologic variation of such pre-Hispanic dog burials was carried out by Tschudi (1844), Nehring (1884, 1887) and Allen (1920). Thus, there are several notes about the first pre-Hispanic Peruvian dogs, in particular those from the Ancon excavations.

Although Nehring studied a small number of dogs, the variation found is considered enough to sort such material into three different varieties: the Peruvian sausage dog (from Spanish, “perro salchicha peruano”; *Canis ingae vertagus*), the long-haired Inca dog (from Spanish, “perro inca de pelo largo”; *Canis ingae pecuarius*), and the dogo dog or Peruvian bulldog (from Spanish, “perro dogo” or “bulldog peruano”; *Canis ingae molossoides*).

Such namings proposed by Tschudi (1844) and referred by Nehring (1884, 1887) are based on studies of dog burials from the Ancon Necropolis, being the “*salchicha peruano*” a fleecy dog, with a shape, structure, teeth and size different from the other two varieties, being very similar to the fleecy dog that is currently common.

The “*perro inca de pelo largo*” shows a significant size, currently living on the high plateaus where it is used as shepherd and guardian dog, being described by Tschudi (1844) as a fierce and dangerous animal. On the other hand, the “*perro dogo” or “bulldog peruano”*, looks like a mastiff, with short and straight hair, short and square snout and prick ears, which seems extinct nowadays or having disappeared as phenotype among the numerous breeds appearing at post-Hispanic times.

Nevertheless, the binomial naming of *Canis ingae* does not exist in the mammal taxonomic lists, including the *Canis* genus. Naturalists like Tschudi and Nehring gave such name after the morphological studies of dog skeletons

discovered on the necropoli and based on cultural naming. In this case, all individuals belong to the *Canis familiaris* species, which is also currently named as *Canis lupus familiaris*, after the phylogenetic origins and domestication of the dog from the wolf (Vilá et al, 1997; Leonard et al, 2002).

Sorting the pre-Hispanic dog groups based on weight only is complicated. Thus, skull osteometric measurements have been used, concluding that the dogs studied by Nehring and Allen are mesocephalic, being associated to the shepherd dog prototype. The analysis of multiple variables, by means of statistical calculations of distances related to the osteometric data, generates a systematic information, avoiding possible false associations based on breed.

Following these criteria, other specialists like Brothwell et al, (1979) have identified a “small dog” in remains from the Chicama valley (department of La Libertad), using the nose length as useful measurement (Figure 1). Such measurement shows an important variation, indicating the existence of a “perro de nariz corta” in the Ancon and Pachacamac specimens.

Yet another variable generating important information about the pre-Hispanic Peruvian dog variation is the basal skull length, in relation to the bizygomatic width. When comparing this variable with the modern breeds it has been found a large variation on the triangle made by “Griffon”, “San Bernardo” and English “Bulldog”, with the pre-Hispanic Peruvian dogs comprising a significant part of the central zone. This suggests specific sites of micro-evolution (genetic drift), as in the case of Ancon and Mala (Brothwell et al, 1979).

Other reports about the pre-Hispanic Peruvian dogs are the ones by Málaga (1977), showing that the mummies and the current aboriginal dogs of the sierra and coast of Peru seem to be equivalent, so that they can be sorted in three types: a) the “helping dog” (from Spanish, “perro de ayuda”) of Guaman Poma de Ayala, with medium size; b) the “pet” (from Spanish, “perro de compañía”), with long body and short limbs; and c) the “miniature dog” (from Spanish, “perro miniatura”), with graceful proportions, which therefore would be similar to the Chihuahua.

It is also reported that pre-Hispanic tombs usually contain dog mummies with long, straight and curly hair. The ceramic representations of the Moche, Chimu and Chancay only contain the varieties of short-hair dog and embrionary-skin mutant dog (meaning the “*perro peruano sin pelo*” or “*perro viringo*”). Yet another interesting data of the work by Málaga is the inclusion of osteometric data, whose conclusions and cephalic indices allowed to place the studied dog sample in the mesocephalic breeds (Málaga, 1997).

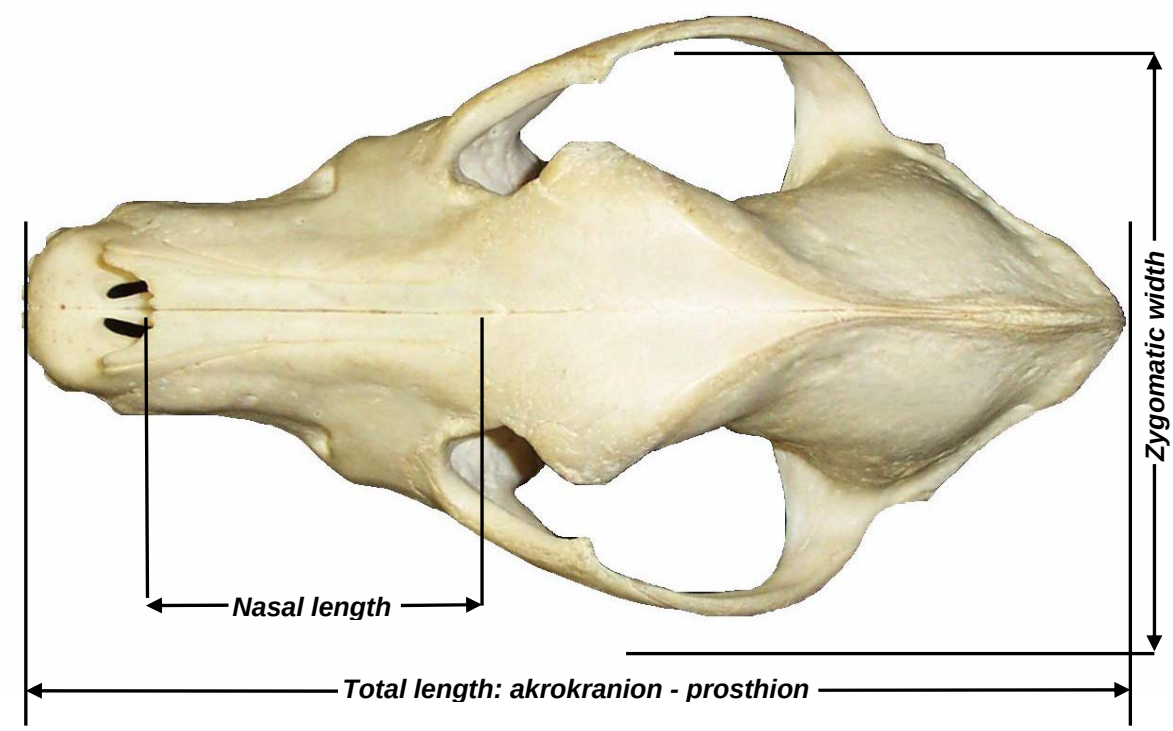

Figure 1. **Dog skull osteometry.** *Canis lupus familiaris* skull dorsal view, showing the three main measurements used after Driesch (1976) to sort the pre-Hispanic Peruvian dog morphotypes.

Archaeological investigations carried out at sites of the Southern Peruvian coast, specifically at Ilo, have allowed to identify almost complete and well preserved remains of 43 dogs nearby their also mummified masters, at sites of the **Chiribaya** culture (900-1350 years AC).

The studies suggest that these dogs were used to handle camelid flocks and that their masters believed in dog life after death, much as in the ancient Egypt. The excellent preservation status of the mummified remains has allowed to observe physical characteristics, like the limbs or the hair color, and to compare them to establish identities with the current dogs living on the Ilo surroundings.

The naming "*pastor Chiribaya*" has been chosen for the potential new Peruvian dog by the Centro Mallqui archaeologists, in charge of Ilo excavations, as well as the Peruvian Kennel Club specialists. The "*pastor Chiribaya*" has an intermediate nose, hare-like limbs, long hair usually of beige color, spiky tail, with ears not being prick or lazy/floppy but similar to the ones of a small "Golden Retriever" (Meir, 2006).

The only Peruvian dog breed recognized by the FCI and that lived in pre-Hispanic times is the "*perro peruano sin pelo", which was wrongly named as Canis caraibicus* (Allco, Viringo), being a small dog, specially raised by the Caribbean and sold by them in all the neighboring isles of the coast of Colombia and Venezuela (Latchman, 1922), which probably is the reason behind the former binomial denomination.

These dogs lack canines, premolars and hair, having black epidermis and a genetic mutation named *ectodermal hypoplasia, which seems related to the lack of premolars (Figure 2).*

Figure 2. **Left jaw of a "perro peruano sin pelo" specimen.** Premolars are absent, representing the phenotypic expression of a mutant gene of this ancient dog breed. The rule figures correspond to centimeters (picture: private collection Victor F. Vásquez Sánchez).

This dog breed is widely represented on the Moche, Chimu, Chancay and Vicus iconography. A large quantity of bone remains from domestic contexts of the Tucume site are also available. Cut signs have been found, specially in the proximal humerus, indicating carnage activities. The atlas vertebra is yet another bone showing cut signs, indicating slaughter activities (Vásquez et al, 1991).

Therefore, it is considered that the variation degree of the different measurements of the pre-Hispanic Peruvian dogs allows to define two nuclear morphotypes, which are represented independently of the hybrid status of them: a first group of dogs of short forehead, and a second group of median size. To such two morphotypes identified by osteometry can be added the unique pre-Hispanic dog breed recognized by the FCI ("*perro peruano sin pelo*") and the possible consideration of a new breed represented by the "*pastor Chiribaya*".

Such differentiation degree is likely the result of an intentional selection carried out by the ancient Peruvians, yet it is also possible that such variation degree was already present on the dogs arriving with the first human groups to South America. Later on, such first dog founder colonies of pre-Hispanic Peru went through allopatric speciation events (genetic drift), generating typical micro evolution sites for some currently living morphotypes. Such is the case of the Moche period dogs, which are described below.

Moche period dogs: Two morphotypes and one breed

The dog was frequently used with felines and lunar deity on iconographic representations of North Peruvian coast pottery. Such close association of the dog with deities is an interesting characteristic. People believed that the moon was ill during a lunar eclipse, could die, fall over the Earth and cause a destruction. Such society could have sacrificed dogs to try and prevent possible disasters (Garcilaso, 1959).

Bone remains of complete individuals have been recovered, as well as sculptural pottery and iconographic representations of the Moche period representing dogs. Such evidences are present at several Moche, Chimu and Lambayeque sites, being the most interesting those associated with the fabulous Moche tombs, due to the historical importance of such discoveries.

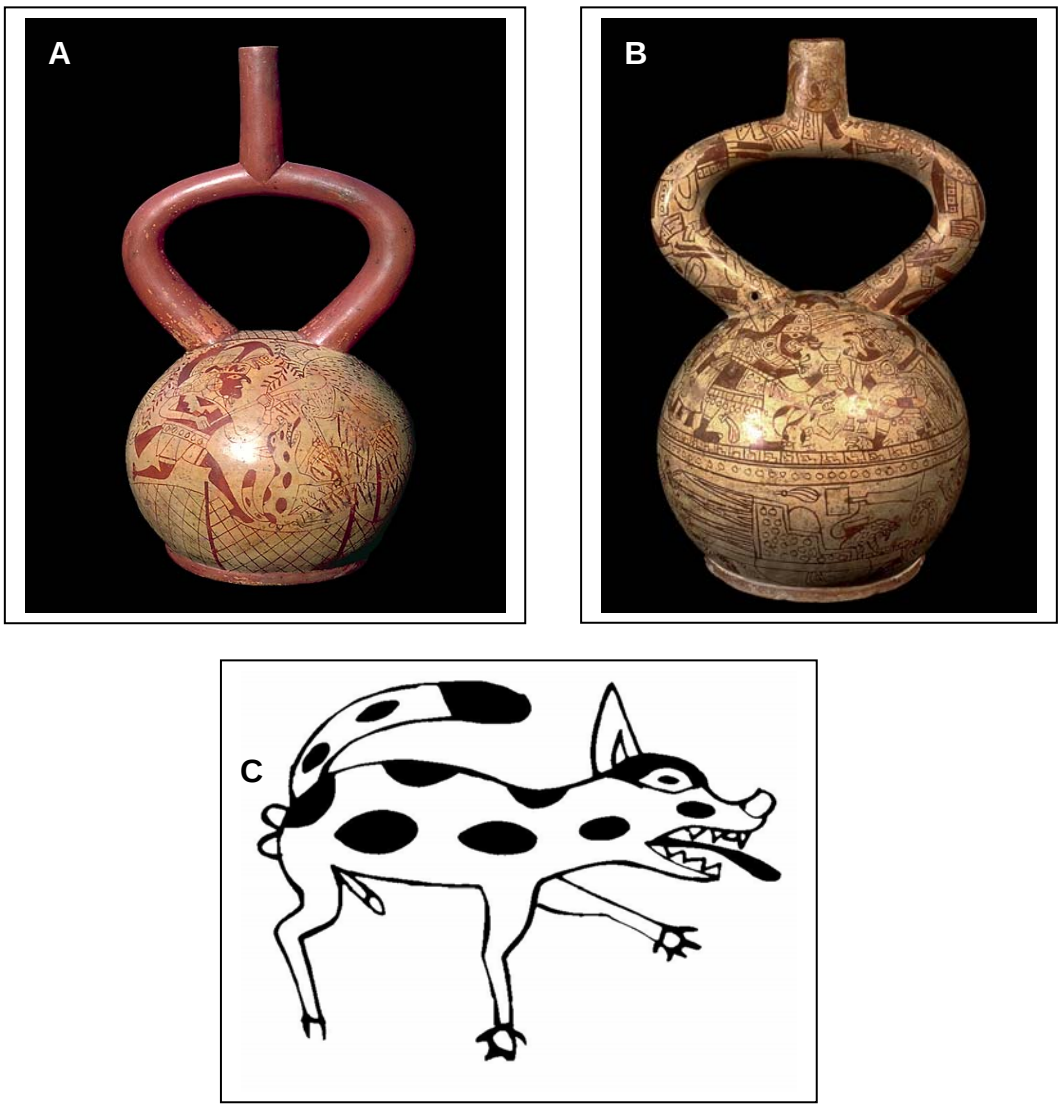

Figure 3. Moche canine iconography. (**A**) Moche bottle of the stylistic IV phase, with a deer hunting scene, representing the Moche dog morphotype in attack mood (picture: Steve Bourget); (**B**) Moche bottle of the stylistic IV phase with a ritual scene of priests drinking blood, presence of *ulluchus* and the Moche morphotype dog (picture: Steve Bourget); and (**C**) magnified representation of the Moche dog morphotype, from the hunting and ritual scenes of the Moche bottles of the stylistic IV phase (adapted from Donnan, 1976).

On the year 1985 one of the most important elite tombs of the Moche period was discovered. On the Sipan village (department of Lambayeque) on the so called Priest Tomb (from Spanish, “Tumba del Sacerdote”), dated 300 years AC, and around the central timber coffin, two women skeletons were found, a man on a reed coffin, a kid with a dog and snake remains. A llama skull was found on a corner, apparently, intentionally decapitated for this purpose, and pot niches on the sides. The dog rested over the kid, from the pelvic region to the coffin end, where the serpent skeleton was found.

Schwartz (1997) considers that such dog skeleton seems to correspond to a Moche warrior scene described by Donnan (1976), who also indicates that it is a dog with sharp-pointed ears and tail, bending upwards, with spots, but larger than those of felines. The hair is possibly short, stuck to the body, interestingly noting that such dogs were never anthropomorphized (Figure 3C).

It is indicated that it corresponds to a small dog, with black and white spots, possibly with short hair very stuck to the body (Kutscher, 1954). There is also a warrior scene on the Moche iconography showing other black dogs, possibly having longer hair (Figure 4). This dog has medium size sharp-pointed ears, standing out the long and luxuriant tail, meaning that this dog morphotype had more hair than the one described by Donnan (1976).

Figure 4. Moche canine iconography. (**A**) Warrior scene obtained from the Moche iconography, showing the second dog morphotype of such period; and (**B**) magnified representation of the second morphotype of Moche dog tail. It is a dark specimen with luxurious tail, which indicates that had longer hair than the previous morphotype (adapted from Donnan, 1976).

Possibly, this fight scene of the Moche iconography has relation to what is indicated by Murua (1987) about war preparative sacrifices, in which "*unos perros negros, que en aquel tiempo había, llamados apuurcos, y matábanlos y echábanlos en una llanada y con ciertas ceremonias hacían comer aquella carne a una gente que se entiende ser uros, gente zafia, vil y para poco, del Collao*".

A total of 13 sculptural pots representing dogs with up and short snout, with emphasized ears and eyes with apparent wrinkles represented on the neck of medium globular pitchers have been found in the tomb of the Old Sipan Lord (from Spanish, "Viejo Señor de Sipán") (Figure 5). Five of them had the body decorated with a kind of triangular pectoral, and six have such semicircular attire imitating shell pieces. The characteristics represented on such pottery seem to correspond to the "*perro peruano sin pelo*" or "*perro viringo*".

Figure 5. The "perro peruano sin pelo". (A) sculptural representations of the "perro peruano sin pelo" from the funeral layette of the "Viejo Señor de Sipán" tomb; and (**B**) modern specimen of this primitive breed that also lived on the Moche period (picture: César Gálvez Mora).

On the other hand, the "Sacerdote" tomb dog has not been studied with the precision of the current zooarchaeological techniques, lacking osteometric data that could allow to associate it with modern breeds.

Other Moche site providing dog remains is Huaca Cao Viejo. Thus, a bottle with a dog representation was found by the feet of a woman buried in the second burial event, corresponding to the so called "Tumba de Cámara 1B". Such sculptural bottle corresponds to the II/III Moche stylistic phase (César Gálvez, personal communication).

The dog represented on such sculptural bottle has again similarities with the morphological features described by Donnan (1976), in relation to the "Sacerdote" tomb in Sipán and with the Moche iconography. It is a dog with spotted body, sharp-pointed ears and a spot around the eye (Figure 6), as shown on the deer hunting scene. Yet another feature of this Moche dog morphotype is its high social association with important personalities of the Moche society.

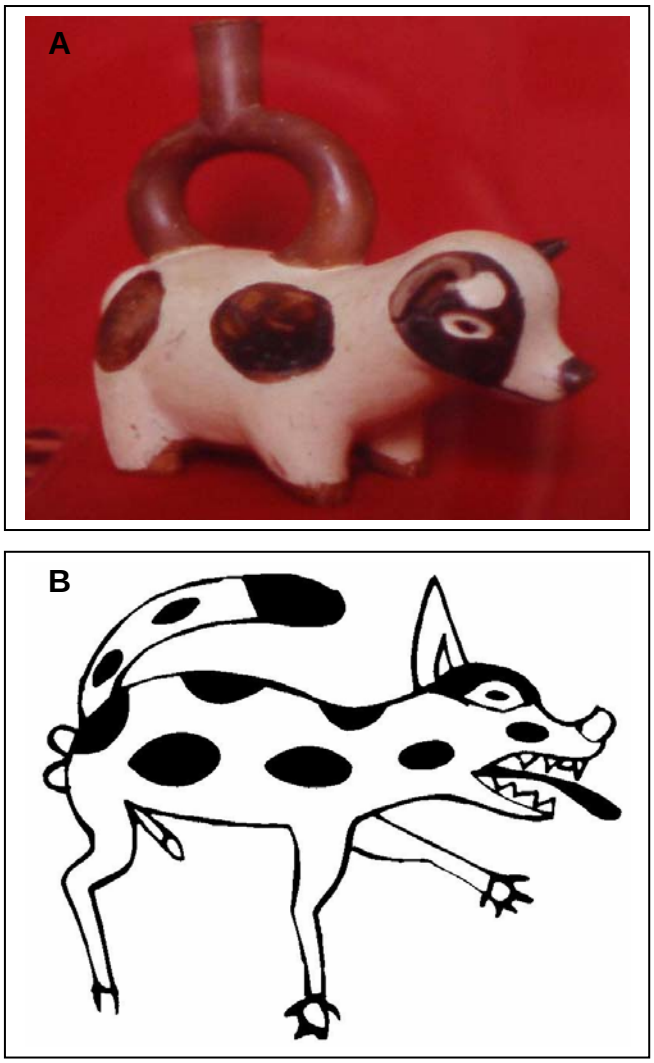

Figure 6. Moche canine iconography. (**A**) Sculptural Moche bottle from the II/III stylistic phase, from a chamber bomb of the Huaca Cao Viejo, representing the dog morphotype also shown on the deer hunting scene and in the priest ritual scene (picture: César Gálvez Mora); and (**B**) Moche dog morphotype possibly corresponding to the sculptural bottle from Huaca Cao Viejo and the burial associated to the "Sacerdote de Sipán" tomb (adapted from Donnan, 1976).

These two dog morphotypes shown on the Moche iconography and the sculptural representation of ceramics recovered at Huaca Cao Viejo are the two main dogs that were associated to a high social level at such period, both for the context inferred from the iconography, as well as for their presence as osteologic and sculptural evidence.

It is possible that these two Moche morphotypes of dogs had long canine teeth, were basically carnivorous and fed with hunted animals. Its aggressive mood would favor their use for hunting, mainly deer, being trained to corner them, so that the hunters could kill the preys afterwards.

The only pre-Hispanic breed of dog living in the Moche period that has been identified as such is the "*perro peruano sin pelo*", which was not used for hunting, since it lacks premolars, a genetic deficiency possibly caused by the *ectodermic hypoplasia* mutant gene.

At some time after the year 500 BC, this hairless dog arrived at Peru, was initially represented as the first rarity for the Moche and afterwards was very frequently represented on the Chimú, Chancay and Lambayeque ceramics. It is possible that this dog was brought to the Peruvian coast as part of a commercial exchange system between the west of Mexico and South America (Schwartz, 1997).

Yet, this dog breed did not have a ritual role on the Moche culture, except for the sculptural ceramics found in the "Viejo Señor de Sipán" tomb. This dog may have been valued for the hairless mutation, having a domestic role. In fact, it was probably selected due to its curious and exotic appearance (rare animal), which can be considered as an advantage for a pet.

This breed was accepted as autochthonous of Peru by the General Assembly of the International Cinological Federation, due to the work of the Eng. Ermanno Maniero (in representation of Peru) and of Peruvian Kennel Club members. Thus, it was registered with the number 310 in the breed nomenclature corresponding to Group V of the FCI, in the section of ancient dogs, on 12th June of 1985 at Amsterdam (Netherlands). Finally, the standard was approved with the official name of "*perro peruano sin pelo*", on the el 30th of May of 1994.

If the chronological data of its arrival to Andean territory are correct, this dog has an evolutionary history of about 2.500 years, which is the reason to consider it an ancient dog. Therefore, it represents a living legacy left by the Moche. On the other hand, the two morphotypes represented on the iconography and ceramics seem extinct. Yet, in 1996 we had the opportunity to find a dog with spots around its eyes, albeit with large spots in its body. This dog was living in the surroundings of Huaca Prieta ("Complejo Arqueológico El Brujo"). Its morphological appearance (Figure 7) suggests some genetic reminiscence of the Moche dog morphotype that had a high social level role on such times.

Figure 7. Possible Moche dog descendant. Modern dog morphotype (*Canis lupus familiaris*) found on the surroundings of Huaca Prieta ("Complejo Arqueológico El Brujo", Peru) on 1996 (picture: Víctor F. Vásquez Sánchez).

Conclusions

The bibliographic revision, iconography and sculptural representations have allowed to reveal the presence of two nuclear morphotypes of dog that lived in the pre-Hispanic Peru: a primitive breed (*perro peruano sin pelo*) and other putative breed (*pastor Chiribaya*). The variability is not high, as expected for a species with 337 currently recognized breeds by the FCI. Yet, there is a wealth of remains waiting to be methodologically studied to know new aspects of the diversity of these pre-Hispanic Peruvian canids.

Although the dog remains associated to the "Sacerdote" tomb at Sipan have not been subjected to osteometric studies, the representation by Alva (1994) of this dog, in the reconstruction of the burial context, brings it near the descriptions made from the iconography. Thus, a dog with hair stuck to the body, black spots on the body and sharp-pointed ears is shown, which represents the best fit to this Moche dog morphotype.

The other Moche period morphotype is yet rarer, since it is a black haired dog, with abundant hair as shown by its tail. Yet, the details about it are scarce, with a single report of such dogs by the chroniclers (from Spanish, "cronistas") associated with the Collao area.

Although there are no bone remains of the "*perro peruano sin pelo*" on Moche contexts to date, the ceramic representations demonstrate that this dog had a different role than the two morphotypes previously described, and that it was important on the Moche culture, based on the 13 ceramics found in the "Viejo Señor de Sipán" tomb. It is important to note that this primitive dog breed, that arrived from Mexico, has survived for 2.500 years, being one of the Peruvian representative breeds, currently spread across different countries of the world.

Yet another important evidence of a putative pre-Hispanic dog breed is the case of the "*pastor Chiribaya*". The molecular data generated from aDNA studies of the Chiribaya dogs demonstrate that there is a specimen representing a haplotype (D26) previously described. The other haplotypes (D30 and D31) are new, making a clade with three specimens from Bolivia and one from Mexico. There are no sequences of such clade on samples of 350 modern breeds, which suggests the replacement of the native American dogs by those brought from the Old World (Leonard et al*,* 2002).

This suggests that the Chiribaya dogs could represent a special case of speciation and evolution of a possible breed in this site, which should be demonstrated with DNA studies, in relation to the modern breeds of such site, as well as the rest of FCI requirements.

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