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Human-Dog Bond in the Contemporary Mayab: Social Perceptions and Benefits Associated with the Hunter-*Milpa* Dog in Maya Peasant-Hunter Life Strategies in Yucatan, Mexico

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Abstract. Human-dog interaction has been examined in various sociocultural contexts, but such relationships have not been well explored for contemporary subsistence practices in Neotropical areas. In this study, we document human-dog bonds in terms of their relevance for Maya peasant-hunters' life strategies in a rural community of the Northwest Yucatan Peninsula. To better understand social perceptions of dogs, we gathered ethnographic data through semi-structured and in-depth interviews with Maya peasant-hunters and participant observation in a Maya community. We paid particular attention to the sociocultural dimensions of subsistence hunting, agriculture, and the everyday activities of peasant-hunters and their families. We found that most peasant-hunters recognized the versatility of dogs in hunting and as sentinels for agricultural and home-gardening practices. We also found that dogs transcend their utilitarian value by granting prestige to their owners through hunting and by protecting them from harmful non-human entities of Maya cosmovision. Based on our results, we propose the "hunter-*milpa* dog" as a category encompassing the unique bond forged between Maya peasant-hunters and their dogs. Our definition contributes to a more substantive understanding of these canines as social actors linked to the subsistence life strategies in rural settings of Mesoamerica.

Keywords: dogs, subsistence hunting, *milpa*, Maya, Mesoamerica

Introduction

Human-dog bonds have been strengthened in different sociocultural contexts (Morey 1994; Treves and Bonacic 2016), as recently evidenced by subsistence strategies (e.g., hunting) practiced by rural people in Neotropical areas (Alves et al. 2009; Koster 2009; Plata et al. 2019). In these rural settings, the free-roaming dogs associated with human households or "village dogs" (Ruiz-Izaguirre and Eilers 2012) heavily contrast with other categories, such as dogs kept as "pets" within specific households and maintained for emotional purposes, and "feral dogs" who have lost their domestication status (Bonacic et al. 2019; Young et al. 2011). Although village dogs could share some characteristics with hunting dogs in various regions of the New (Alves et al. 2009; Constantino 2019; Koster 2008) and Old World (Lupo 2011), none of previous categories satisfactorily reflect the human-dog bond in Maya communities of Yucatan Peninsula, Mexico.

In the contemporary Mayab, the dog (*peek* in Yucatec Maya) not only aids in the execution of hunting but also provides sociocultural benefits to their owners (Plata et al. 2019). In subsistence hunting, dogs play a central role in group hunting or *batida*, which entails two sub-groups of hunters working together to ambush terrestrial animals whose meat is distributed among participants, including the dogs (for a detailed description, see Rodríguez et al. 2012). In this setting, dogs are socially

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valued for their central role in tracking and pursuing potential game prey (León and Montiel 2008; Rodríguez et al. 2012) and obtaining wild meat, such as white-tailed deer (*Odocoileus virginianus*) and collared peccary (*Pecari tajacu*).

Our previous research (Plata et al. 2019) shows that, in *batida*, dogs transcend their primarily utilitarian purpose by increasing the social prestige of their owners by obtaining prey of conspicuous social and symbolic value (e.g., deer; see Dehouve 2008). In addition to the dogs' role as active agents in the social dynamic of *batida*, these canines also participate in contemporary hunt-associated healing and luck-granting ceremonies (Brown and Emery 2008; Olivier 2015; Plata et al. 2019; Santos-Fita et al. 2015), and are believed to protect against the guardian spirits of nature that dwell in the wilderness or *monte* (Brown and Emery 2008; De la Garza 1997; Plata et al. 2019; Rodríguez-Balam 2010; Villa-Rojas 1978).

Besides hunting, agriculture and home-gardening practices have also been key components in the subsistence economy of the Yucatec Maya since pre-Hispanic times (Barrera-Bassols and Toledo 2005). These traditional practices have been described as the multi-species seasonal agriculture extensively used in Mesoamerica or *milpa* (Rodríguez and Arias 2014), and the home-gardening of diverse plant species in coexistence with domestic animals in the *solar* (basic territoriality unit adjacent to the vernacular Yucatec Maya house, see Cabrera 2014; Hernández 2010). Altogether, these three activities are conceptualized as the core of "the multiple-use strategy" of the Yucatec Maya, namely the use of several productive practices in different landscapes, complemented by commercial activities, to survive the harsh environmental conditions of the Yucatan Peninsula (Barrera-Bassols and Toledo 2005).

To date, several studies highlight the close relationship between dogs and maize in the Mesoamerican context (see De la Garza 1997; Valadez and Padilla 2005; Valadez et al. 2014), and dogs' importance for subsistence economy beyond hunting as sentinels in the agricultural and home-gardening practices in contemporary rural settings (Almeida and Pantoja 2004; Constantino 2019; Koster 2009; Ley-Lara et al. 2015). However, an integral conceptualization of dogs as part of subsistence social practices in contemporary Mayab is lacking. Hence, the multidimensional value of dogs (Plata et al. 2019), and their participation in the three core activities of "the multiple-use strategy" of the Yucatec Maya, calls for a suitable redefinition of these canines that accounts for their relevance in the life of rural Maya families. Here, we expand our knowledge regarding human-dog relationship by revealing the social perception of dogs and their relevance to the life strategies of Maya peasant-hunters of the Yucatan Peninsula.

Materials and Methods

Area and Study Community

This study was conducted in the Maya community of Los Petenes, one of the 19 rural villages located near Los Petenes Biosphere Reserve (LPBR; 20° 51′–19° 49′ N, 90° 45′–90° 20′ W), a federal reserve established in 1999 on the west coast of the Yucatan Peninsula (Figure 1). In this region, Maya people hunt a wide variety of animals (ca. 54 species; Méndez-Cabrera and Montiel 2007) for subsistence purposes, mainly targeting at least nine terrestrial mammal species for wild meat (León and Montiel 2008; Montiel 2010).

In the last decade, the community of Los Petenes had a population of 885 inhabitants (467 men and 418 women, most of them bilingual Maya-Spanish [Instituto Nacional de Estadística, Geografía e Informática 2010]), and 133 dogs (Weber 2010). Locally, men carry out seasonal agriculture in the *milpa* and are frequently assisted by other family members, while women and children carry out the daily

Figure 1. Approximate location of Los Petenes (black dot) to the west of Yucatan Peninsula. Notice the nearby location to the Biosphere Reserve of Los Petenes (shaded rectangle).

activities in the *solar*. Household income is usually complemented by men's labor in commercial activities, such as masonry (Oliva et al. 2014; Plata et al. 2019; Rodríguez et al. 2012), and women's market sale and communal agroforestry activities (Rodríguez-Canto et al. 2016). Subsistence hunting is traditionally performed by men (especially in *batida*, where women's presence is considered taboo); thus, women only engage in hunting under particular circumstances (such as family hunting parties consisting of wife and children along with the peasant-hunter; see *chan batida* in Rodríguez [2010]). Previous studies carried out in this Maya village by our research group (León and Montiel 2008; Oliva et al. 2014; Rodríguez et al. 2012) strengthened the ties with local people for conducting fieldwork research.

Data Collection and Community Work

For a six-month period, the relationship between peasant-hunters and their dogs was documented via semi-structured interviews with local peasant-hunters practicing the traditional *batida* in Los Petenes. We examined the central role of dogs in this hunting strategy (see Plata et al. 2019), focusing our analysis on the value of dogs as part of the multiple-use subsistence strategy of peasant-hunters. For this

purpose, in-depth interviews were held with owners of outstanding hunting dogs and prestigious hunters recognized by the other members of *batida*. In the household, complementary interviews were also conducted with peasant-hunters' relatives, allowing us to enrich our understanding of the dogs' domestic contexts. The information from the interviews was recorded in audio/video format, with prior consent of the interviewees. Participant observation was conducted on four *batida* hunting trips to gain greater insight into the bond between peasant-hunters and their dogs in other relevant locations outside of the household, such as the *milpa*, *solar*, and *monte*.

Data Analysis

To assess the peasant-hunters' perception of *batida* dogs, we compared the interviewees' responses and contextualized this information with the ethnographic data obtained through participant observation. In addition to the linkage of social perceptions of dogs with the sociocultural dimensions of *batida* (i.e., practical, social, and symbolic), we assessed the multidimensional value of dogs in accordance with daily local activities of peasant-hunters and their families through the linkage matrix proposed by Oliva and Montiel (2016).

In this study, we analyze the local elements associated with the dogs of Maya peasant-hunters' that transcend the *batida* context, highlighting dogs' connection with the multiple-use strategy of Yucatec Maya. More specifically, we take into account eight sociocultural elements at the local level: acquirement purpose; type of dog; nourishment; shelter; commands for cohabitation; primary use; norms associated with dogs; and utility of dogs beyond *batida* to detect beings imperceptible to the hunter (see Plata et al. 2019).

Results

Maya Peasant-Hunters in Los Petenes

The interviewees were active participants (N = 36 men) of the *batida*, born in the community (97%), and were 48 years old on average (range = 16–81). They identified themselves as peasant-hunters and heads of households (94%) with an average of four economic dependents (range = 1–9). Peasant-hunters performed hunting activities complementary to other subsistence practices, such as seasonal agriculture (*milpa*) and charcoal production. Likewise, interviewees reported to also support home-gardening and other activities, such as raising domestic animals in the *solares* for family consumption. A total of 38% of the interviewees reported that they engage in various commercial activities, such as mason labor, factory work, and local commerce. Nearly half of *batida* participants (46%) practiced the hunting activity (either group or individual) at least two times per week in the agroforestry areas near Los Petenes. These areas are locally known as *monte* or *K'aax* in Spanish and Yucatec Maya, respectively. The white-tailed deer was identified as the favorite prey of *batida* participants.

The Versatile Use of Dogs in Los Petenes

During fieldwork, we registered 51 dogs belonging to *batida* participants (N = 36). The dogs were mostly males (57%) and, based on the individual ages estimated by their owners, had an average age of three years (range = 0.5–7). Peasant-hunters stated that their main purpose for getting their dogs was for hunting-related activities (73%), specifically tracking and pursuing prey during *batida*. A secondary purpose was as sentinels (23%), driving away invasive animals that could harm crops in the *milpa* during the harvest season (September-October),

and in the *solar* home-gardens. Only 4% of dogs were kept as pets. Most dogs in Los Petenes were obtained through gifting (69%) by family members and friends from nearby villages. Purchasing (14%) was a less common source of procurement and appealed to hunters only when acquiring specialized hunting dogs, such as hounds. The least common sources of dogs were adoption and keeping a pup from a previous litter (11%).

The interviewed peasant-hunters identified different types of dog or *peek* based on behavioral and physical attributes (commonly expressed as "breeds") and their efficiency to perform specific roles in subsistence activities (Figure 2). The vast majority of dogs were categorized as *malixes* (singular *malix,* mixture in Yucatec Maya) or mixed-breed (86%), which were considered local dogs who are resistant to the harsh conditions of the local environment, such as heat and work under food shortage. The rest of the dogs were described as hounds or *sabuesos* (14%), bought from breeders outside the village over the past 30 years. These dogs were distinguished by their longer snouts, ears, and tails when compared to *malixes*, and were highly valued for hunting due to their innate ability of tracking deer.

> You can figure out if it is a *sabueso* through the ears and tail. Other dogs do not move their tails as *sabuesos*… They start to track when they smell the deer's scent. That is why I said *sabuesos* are good. (peasant-hunter, 48 years old)

At least one dog was described as belonging to a specific breed of guard dogs, accentuating its dark color and aggressive temperament against household trespassers (humans and animals). Dogs without specific use in subsistence activities, but with strong affective bonds with Maya families, were classified as pets. Lastly, peasant-hunters talked about feral dogs or *balam peek* (jaguar-dog in Yucatec Maya), believed to be descendants of abandoned dogs that lost their domesticated status and avoid human contact.

An important difference pointed out by dog owners was the cost and time associated with the acquisition and care of their dogs. While *malixes* were obtained through gifting or adoption due to their regional abundance, *sabuesos* were usually bought through breeders. One peasant-hunter suggested that gifting *sabueso* dogs helped the owners to share the expenses of the pup maintenance (i.e., food and medicines), while opening up the possibility to retrieve a pup in the future in case of need. In contrast, *malixes* were generally fed leftovers, occasionally supplemented with commercial dog food. In general, dogs were kept in the *solar* as sentinels and have assigned spaces for shelter from sun and rain. The peasant-hunters reported keeping their dogs in the *solar* to prevent them from wandering around the village, fearing they may be killed.

Figure 2. *Sabuesos* (left) and *Malix* (right) dogs resting during a *batida* in Los Petenes.

During in-depth interviews, a peasant-hunter stressed *sabuesos* scent-tracking abilities, making them particularly useful for keeping the scent while chasing deer. They were also less aggressive (described as gentle), making them vulnerable to animals who resist (i.e., peccary). In contrast, *malixes* were described as versatile because of the other roles they perform, such as sentinels in the *milpa* and *solar*. For hunting, they were useful to obtain a greater variety of prey, such as badger (*Nasua narica*), iguana (*Ctenosaura similis*), and turkey (*Agriocharis ocellata*), as well as more resilient to hunting fatigue.

> In the past, they only used *malixes* in the *batida*. They took them into the *monte* without knowing how to hunt and surprise! *malixes* chased a deer… I had a *malix* that learned how to track armadillos into their burrows, that same dog also learned how to track possum, another day an iguana… it also faced a rattlesnake and a huge mouse snake. (peasant-hunter, 59 years old)

Dogs were incorporated into the *batida* hunting hierarchy as two separate classes. *Maestro* dogs were for tracking and chasing large prey (i.e., white-tailed deer and peccary), while *secretario*s are dogs that follow the *maestro* lead for catching small prey only (i.e., badger, iguana, turkey). In return for their important role, *maestro* dogs receive as much meat as other human participants in hunting, while *secretario* dogs only receive blood and the prey's remaining entrails.

Although in *batida,* the *maestro* dogs were central for tracking and chasing white-tailed deer, semi-structured and in-depth interviews confirmed the use of dogs during individual hunting modalities. In individual hunting, dogs played a secondary role in tracking deer that were not immediately killed when shot. In this case, peasant-hunters reported borrowing a *maestro* dog for such task and, in exchange, the dog's owner received part of the prey (i.e., leg, stomach, and head).

Interviewees mentioned maintaining their dogs, especially those used in hunting, within their households. In the case of *sabuesos*, their owners feared such dogs could be injured in an accident, stolen, or poisoned due to other hunters' envy. The *malixes* guarded households from strangers and chased animals that could damage crops and domestic animals in the *solar* (Figure 3).

> Dogs stay in the *solar*. They go out sometimes, but people do not let them wander at dusk… in the house, if the owners are not there, the dogs would not let anyone pass. In *batida* you can pet a dog, but at the entrance of the house that dog will no longer let you approach. (peasant-hunter, 37 years old)

To manage their dogs, peasant-hunters alluded to different forms of communication, such as calling the dogs by their names and giving them instructions through verbal commands and manual cues to perform specific tasks in the *batida* (e.g., follow, track scent, chase, come) and the *solar* (e.g., chase invasive animals, kill a chicken, search, come). The *malixes* also protected *milpa* crops.

> The badgers do not go into the *milpa* because of dogs' scent… people bring dogs daily… some guys bring their dogs to the *milpa* and tie them. (peasant-hunter, 47 years old)

Sociocultural Elements of Dogs in Los Petenes

Among the peasant-hunters interviewed, 56% reported that having a dog successful in deer hunting would grant them the respect and admiration of their peers in *batida*. Likewise, owners of successful dogs were invited to participate in *batida* or asked to if their dogs could be borrowed for track-

Figure 3. Dogs' participation in Maya peasant-hunters' life strategies. A peasant-hunter evaluates bringing his dog to protect his *milpa* (upper left); *maestro* dogs and their owner walk towards a *batida* (upper right); *pujeros* and their dogs in the group hunting (lower left); black dog watching over the *solar* (lower right).

ing prey in the individual hunting modalities in exchange for a meat share (at least a leg of the hunted animal). Regulation in the use and loan of dogs was recognized collectively by *batida* participants. For example, if a dog is lost during hunting, the owner receives a cash payment from the *batida* group in accordance with the dog's prestige (ca. $100 US).

> If I lend you my dog and something happens like an accident or something, you have to reciprocate, you buy me a new one… in exchange for borrowing a dog, if we shoot a deer we give venison to the dog's owner, we give a leg because the dog also needs to eat. (peasant-hunter, 47 years old)

Most peasant-hunters (65%) attested to a dog's capacity to detect what is mostly invisible for humans, such as the guardian spirits of the *monte* that resemble miniature mischievous Yucatec Maya or *aluxes*, evil winds that carry disease or *mal aire*, and wandering ghosts or *tentaciones*, as well as the dogs' ability to presage danger and bad intentions. According to peasant-hunters, dogs not only bark to warn about the presence of potentially dangerous entities, but can also protect their owners from these entities.

> I went once to the *monte* with my dad, and he went to search for deer, leaving me with the dog… the dog was quiet, and when my dad walked away 40 meters, the dog growled and run five meters towards the other trail, like trying to scare something away… the dog came back frightened and then went into the *monte* again and came back. When my father returned, he told me that ancient people have died in that place. (peasant-hunter, 40 years old)

Maya peasant-hunters reported bringing their dogs as company on their lonely trips to the *monte* for myriad reasons, such as visiting *milpa* and searching for cattle or timber. While in the *monte*, peasant-hunters bring dogs in case of unexpected encounters with potential prey, a common situation in agroforestry settings. Dogs were also useful in detecting hidden dangers, such as vipers (e.g., *Agkristrodon biliniatus, Crotalus durissus, Micrurus diastema*) and jaguars (*Panthera onca goldmani*), as well as spiritual entities (*aluxes*, *tentaciones*, *mal aire*) that dwell in the *monte* according to the Maya cosmovision.

> The black dogs are very good at scaring people at night… people said that they can scare the *mal aire* and *aluxes*… they don't have to be black dogs but they are more effective, everyone knows. I was once working in a place… I had this gray dog looking after me, wagging its little tail, and I thought that if something bad happened to me the dog would warn me first. It was night and the dog started to growl, I told the dog it was nothing, there were no other dogs there… I think it was a *tentación*… the place was illuminated and the dog was passing, but there was nothing… how do dogs see them? There are dogs that are *chingones* (experts). Is good to have dogs, I already learned that dogs are for watching over people. (peasant-hunter, 37 years old)

Most of the hunters identified an illness (77%) that dogs can contract while in the *monte*, either during hunting or other activities. Of these, the main cause of illness was the *mal aire* (43%) or *aluxes* (who caused *mal aire*), which consequently results in exhaustion, weakness, or madness. To heal their dogs, peasant-hunters cut the tip of the ears and tail and bleed the dog to expel the *mal aire*.

> It was a mad dog, the owner said that his dog got a *mal aire*. Maybe tasted human blood. He soon thought it was a *mal aire* and cut the dog's ear… the dog even scared its owner. (peasant-hunter, 37 years old)

Discussion

Historically, dogs have been incorporated into diverse human activities, such as hunting, herding, agriculture, transportation, and guarding, but they also act as companions, signs of status, and as significant components of myths and rituals (Bleed 2006; Cooper et al. 2003; Morey 2006; Snyder and Moore 2006). Through the case study in Los Petenes, the importance of dogs in subsistence settings becomes evident. Dogs clearly were integral and versatile participants in the everyday activities of Maya peasant-hunters in the Yucatan Peninsula. Although these dogs can share features with the so-called village dogs of rural areas (Hughes and Macdonald 2013; Ruiz-Izaguirre and Eilers 2012), as well as dogs in subsistence hunting settings (Alves et al. 2009; Constantino 2019; Koster 2009; Lupo 2011), their incorporation into the multiple-use strategy of the Yucatec Maya has several unique features. Consequently, we propose the "hunter-*milpa* dog" as a category that encompasses the unique bond forged between Maya peasant-hunters and their dogs.

In Los Petenes, the companion dogs of peasant-hunters were not only distin-

guished from regular pets, watchdogs, village dogs, and *balam peek*, they were also incorporated into the hunting hierarchy of *batida* as experienced *maestros* and apprentice *secretarios* (Plata et al. 2019). Even though the *sabueso* was highly recognized as a specialized hunting dog, the *malix peek* was the quintessential dog for Maya peasant-hunters due to its versatile use in the three core activities (i.e., hunting in the *monte*, seasonal agriculture or *milpa,* and home-gardening in the *solar*) of the multiple resource use strategy.

Our study shows that hunter-*milpa* dogs' identities were not only linked to their key roles in the Maya multiple-use strategy of natural resources, but also tied to their place as loyal guides and guardians in Maya cosmovision. Moreover, hunter-*milpa* dogs' participation in the Maya network of hunting relationships (including humans and non-humans, see Brown and Emery 2008) underscores domestication as an ongoing process, that if "escaped" (see Zeder 2012), as in the case of the *balam peek*, epitomizes the loss of the social ties kept between the Yucatec Maya and their hunter-*milpa* dogs.

Dogs in the Maya Peasant-Hunter's Life Strategies

In accordance with the core activities of the multiple-use strategy, Maya peasant-hunters utilized their dogs mostly for subsistence hunting (playing a central role in *batida*) and, in a less critical way, for seasonal agriculture in the *milpa* and home-gardening in the *solar*. In Los Petenes, peasant-hunters distinguished their dogs as *sabuesos*, long-tailed and long-eared dogs with a natural predisposition for tracking deer, or as *malixes*, cross-breed dogs better fit to endure local harsh conditions (such as heat and food shortage) with versatile uses in several activities (Plata et al. 2019).

According to their role in *batida,* dogs provided different benefits to peasant-hunters. *Maestro* dogs that were successful in obtaining deer and peccary bestowed social prestige and additional meat to their owners, whereas *secretario* dogs were auxiliaries in deer hunting and helped to obtain smaller prey for their owners (Plata et al. 2019). The *batida* group strategy, which entails the combined use of experienced *maestro* and auxiliary *secretario* dogs for ambushing prey among two hunting sub-groups, offers a unique strategy that has not been reported in other subsistence hunting settings. The recognition of experienced dogs as *maestros* is analogous to how experienced hunters in *batida* are acknowledged as *chingones* or *maestros* (Montiel et al. 1999; Rodríguez et al. 2012). The use of dogs for tracking and chasing large prey (i.e., deer, peccary) is consistent with other reports regarding the combined use of dogs and guns for obtaining terrestrial mammals (Koster 2008, 2009). The use of *secretarios* is similar to dog use in other regions for pursuing (Lupo 2011) and cornering (Alves et al. 2009) smaller prey.

In *batida*, all *sabuesos* were identified as *maestros* due to their enhanced scent for tracking deer, in contrast to *malixes*, who performed both as *maestros* and *secretarios*. In the case of *sabuesos,* they specialized in hunting deer, thus their scarcity in Los Petenes (14% at the time of research) warrants explanation. Their scarcity may be explained by the high costs associated with *sabuesos* (purchase cost as well as food and medicines) in contrast to the lower costs associated with *malixes*, which were obtained through gifting and fed with leftovers. Another reason for the preference for the cross-breed *malixes* over the specialized *sabuesos* is that the former have: 1) shown hunting proficiency in diverse landscapes (Alves et al. 2009; Constantino 2019; Koster 2009; Lupo 2011); 2) ability to access a greater variety of prey, including those that can be dangerous for *sabuesos*; and 3) a versatile use as sentinels in the *milpa* and *solar* (Plata et al. 2019).

Locally, the vast majority of the peasant-hunters used their dogs as sentinels to

protect the *milpa* crops during the harvest season and watch over the home-gardens and domestic animals in the *solar*. As in other communities in Mesoamerica, the *milpa* is a widespread system that involves the joint cultivation of maize-beans-squash that enables control over food security, providing a base for basic staples (Arias-Reyes 2005; Terán and Rasmussen 1994). For the Yucatec Maya, maize and deer are sacred foods and important elements of identity within the Maya cosmovision (Dehouve 2008; Hernández Xolocotzi et al. 1995; Santos-Fita et al. 2015). The importance of dogs within this system is highlighted by the fact that they not only serve as hunters for obtaining venison, but aid in the protection of maize.

In Mesoamerica, evidence of the use of dogs in crop protection and hunting predates the colonial period (see De la Garza 1997; Olivier 2015; Ramos 2009). Moreover, the contemporary close relationship between the *milpa* system and traditional hunting clearly involves hunting strategies that utilize croplands as traps for attracting potential prey (Ramírez-Barajas and Naranjo 2007). In Los Petenes, a similar strategy has been documented in which peasant-hunters take their dogs and rifles in case they encounter a deer in their recurrent trips to their *milpas* and the *monte* (León and Montiel 2008; Montiel et al. 1999). Likewise, the main hunting sites for Maya peasant-hunters are located in agroforestry areas (Montiel 2010). In this sense, hunting as part of the multiple-use strategy allows access to at least 12 vertebrate species through a diverse landscape of active agricultural fields, fallow areas, and mature forests (Montiel and Arias 2008).

In addition to their roles in *milpa* and hunting, dogs warn their owners of the presence of strangers and prevent other animals (e.g., badgers, other dogs) from preying on domestic animals and crops in the *solar*. Dogs are sheltered in the *solar* at specific places that offer protection from heat and rain, and are often bound with peasant-hunter families as dear members of their domestic unit. The use of dogs as watchdogs to protect households from unwanted strangers (human and non-human) is a quintessential feature of dogs around the world. However, in Los Petenes, the *solar* has a special importance in the multiple-use strategy because these spaces shelter a variety of domestic animals (e.g., pigs, turkeys, chickens) which are important for both daily consumption and ritual use (Barrera-Bassols and Toledo 2005; Cabrera 2014; Hernández 2010).

Hunter-*Milpa* Dogs in Maya Cosmovision

The dogs' incorporation into the social dynamic of the *batida* offer new insights of the social value of these canines in contemporary subsistence hunting, which has been scarcely studied (Koster 2009). For instance, dogs that provided large prey (i.e., white-tailed deer and peccary) were recognized as *maestros* and incorporated into the hunting hierarchy of *batida* analogous to experienced human hunters (see Rodríguez et al. 2012). The *maestro* dog's owners benefited by securing not only additional meat portions (shared with family and dog), but a place in a highly meritocratic hunting hierarchy that usually requires a set of skills difficult to acquire, such as shoot moving animals and track prey (Oliva et al. 2014; Rodríguez et al. 2012). Moreover, norms regulated the benefits of the dog's owners who loaned their dogs for tracking wounded prey. Specifically, in both individual and group hunting modalities, it established compensations in case of the dog's injuries while in the *monte*.

In Los Petenes, peasant-hunters not only took their dogs into the *monte* while actively hunting, but for other reasons, including visiting their *milpas* or looking for forest resources (e.g., palms and wood). During these trips, dogs were valued as loyal companions that aided their owners in finding their way back home and brought help in case of accidents. Similarly, dogs

protected humans from concealed animals (i.e., vipers and jaguars) and otherworldly entities (i.e., *tentaciones* and *mal aire*). According to Maya cosmovision, nature is animate and protected by spiritual guardians (in Los Petenes known as *Yum K'aax*, *Zip, aluxes*) that take revenge on greedy humans that overhunt (Brown and Emery 2008; Olivier 2015; Villa-Rojas 1978). Because these entities regulate human-nature relationships, peasant-hunters must perform rituals to seek permission and negotiate the number of animals they can hunt (Emery and Brown 2012; Quijano-Hernández and Calmé 2002; Villa-Rojas 1978). In Los Petenes, dogs not only alerted their owners to the presence of these entities, but were also incorporated into the hunting rituals (Plata et al. 2019). These rituals consisted in exposing a dog's nostrils to diverse substances (i.e., *copal* incense smoke, chili powder, and venison blood) with the purpose of enhancing the dog's hunting abilities, and to provide protection from the spiritual entities that may cause sickness.

Having dogs as guides and protectors against the hidden dangers in the humans' journey into the unknown, whether in the material or spiritual world, is a common thread in the cosmovision of Mesoamerican people since pre-Hispanic times (De la Garza 1997; Olivier 2015; Ramos 2009; Schwartz 1998; Valadez et al. 2003) and in other regions of the world (Morey 2006; Snyder and Moore 2006). Moreover, the belief in spiritual entities and the practice of hunting rituals remain integral components of contemporary Maya cosmovision in Los Petenes (Oliva et al. 2014; Plata et al. 2019) and other rural villages of the Yucatan Peninsula (Hernández Xolocotzi et al. 1995; Santos-Fita et al. 2015). In this sense, dogs are not only incorporated in the social dynamics of peasant-hunters as *maestros*, through loaning and gifting dynamics, and as active participants in the network of hunting relationships (Brown and Emery 2008), but also help to reproduce symbolic meaning and sociocultural values by mediating human-nature relationships (Ingold and Pálsson 2001).

The close bond between peasant-hunters and their canine companions can be seen in the depiction of the non-human entities reflected in Maya cosmovision. For instance, *aluxes* (intimately linked to *milpas*) are believed to have their own miniature dogs and hunting rifles, and snakes hunt humans with the aid of their own snake-like dogs (Almanza 2000). The contemporary folklore of the Yucatec Maya (Evia 2010) provides insights into the ambivalent nature of dogs in Maya cosmovision. In one story, the *K'aas ba'al* (the personification of evil) is prevented from stealing the soul of a Maya peasant by his loyal dog in spite of his owner's mistreatment and the *K'aas ba'al* bribery. In another story, a Maya hunter crafts a "wax dog" and brings it to life by feeding it with his own blood. The "wax dog" successfully hunts deer for his master, but when the latter stops feeding his creation, the "wax dog" goes on a rampage, killing wild animals, villagers, and, finally, its master. These narratives, alongside our ethnographic evidence, underscores how particular dogs become embedded in the social relationships and life strategies of the contemporaneous Maya of the Yucatan Peninsula. Consequently, we propose the hunter-*milpa* dog as a category which distinguishes these canines from other types of dogs in this important Mesoamerican region. We underscore the relevance of ethnographic studies for a better contextualization of the human-dog bond, with particular emphasis on scenarios in which subsistence practices have a substantial importance in the context of the lives of rural families in settings such as Neotropical areas.

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