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A Pack of Hounds and its Master? A Bi-Species Burial from the Necropolis of Deir El-Banat (Fayum)

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ABSTRACT: Dog burials are known from Egypt from the Predynastic period from c. 3500 BC onward and continue into the Roman era. Different burials have been interpreted in a variety of ways: companion/pet/working animals, associated with divinities, and as guardians. This paper presents a unique interment of a single human and a group of dogs found in the cemetery of Deir el-Banat in the Fayum (Egypt), which can be interpreted as either a religio-magical protective deposit for the cemetery, or a religio-medical one, involving the sacrifice of several animals.

KEYWORDS: FAYUM (EGYPT), CANINE BURIAL, ANIMAL CULT, COMPANION ANIMAL, MUMMIFICATION

RESUMEN: Los enterramientos de perros en Egipto están documentados desde el período predinástico (ca. 3500 a. C.) hasta época romana. Se han avanzado una serie de interpretaciones para los distintos casos que abarcarían desde animales de compañía/mascotas/acémilas, animales asociados con deidades o como meros guardianes del lugar. Este trabajo describe un singular enterramiento en el cementerio de Deir el-Banat en el Fayum (Egipto) donde un individuo fue enterrado con un grupo de perros. Las interpretaciones aquí discurren desde ópticas mágico-religiosas, entendiendo el depósito como un elemento protector del cementerio, a un depósito médico-religioso que implicó el sacrificio de una serie de animales.

PALABRAS CLAVE: FAUYM (EGIPTO), ENTERRAMIENTO CANINO, CULTO ANIMAL, ANIMAL DE COMPAÑÍA, MOMIFICACIÓN



INTRODUCTION

Since 2003, the Center for Egyptological Studies of the Russian Academy of Sciences, in conjunction with the Russian Archaeological Expedition has been excavating at Deir el-Banat (Arab. “Nunnery” Monastery of the Girls, lit.), under the direction of G. Belova. The site is located on the south-eastern edge of the Fayum oasis (29° 12' N, 30° 52' E), some 100 km south of Cairo. It consists of a vast necropolis that stretches over tens of hectares that due to its size and topography was conveniently divided into a “Southern” and a “Northern” part.

During the course of the excavation, 406 graves were excavated in the central part of the Southern necropolis, over an area of approximately 1,400 m². Analyses of the material culture found in the graves demonstrated that the necropolis was continuously used from about the 4th century BC until the 7th century AD. In 2007, at the southwestern edge of the necropolis in the southwestern corner of square III, a new and extremely unusual burial (Grave 133) was unearthed. This burial is thus far unique in Egypt (Figure 1) (Hartley *et al.*, 2011; Ikram, 2013a).

Grave 133 was located on the slope of a hill that constitutes the edge of a shallow valley. The density of graves decreases notably in this part of the cemetery. The burial consisted of the body of a child (the sex could not be determined) interred in a narrow horizontal area 0.30 cm. below the surface (Figure 2).

The exact outlines of the grave could not be clearly traced due to the sandy matrix. Two palm leaf ribs had been placed very close together to the west of the body, and one at the northern edge of the deposit. A multitude of dogs surrounded the body from the waist down. The child lay on the same level as the dogs with more dogs occupying the area beneath the child. During the 2008 excavations, fragments of ceramics and faience vessels of the Roman era (c. 1st to 1st cen. AD) were discovered a few centimeters north of the north side of the grave and in direct connection with the burial. This burial of a human and a “pack” of dogs is the subject of this paper.

The individual human was found lying supine, head to the southwest, in a pit that measured 1.30 m north to south by 0.75 m east to west. This orientation is often associated with Coptic christian burials, but it should be noted that at Deir el-Banat both grave and burial orientation is often arbitrary.

The head and torso part of the body was covered by a piece of textile and the upper part of the body was placed on virgin soil. The skull of the deceased rested against the side of the grave, and thus was slightly raised. The mandible was disarticulated and lay directly on the ventral side of the vertebral column, having separated from the skull and fallen onto the chest. The legs were extended and parallel, with the feet separated from each other by 5 cm. The arms were extended along the body, and the hands lay along the hips. The lower limbs of the deceased were closely bordered by dogs, with others lying beneath the body. While the child was clothed, it bore no evidence of bandaging.

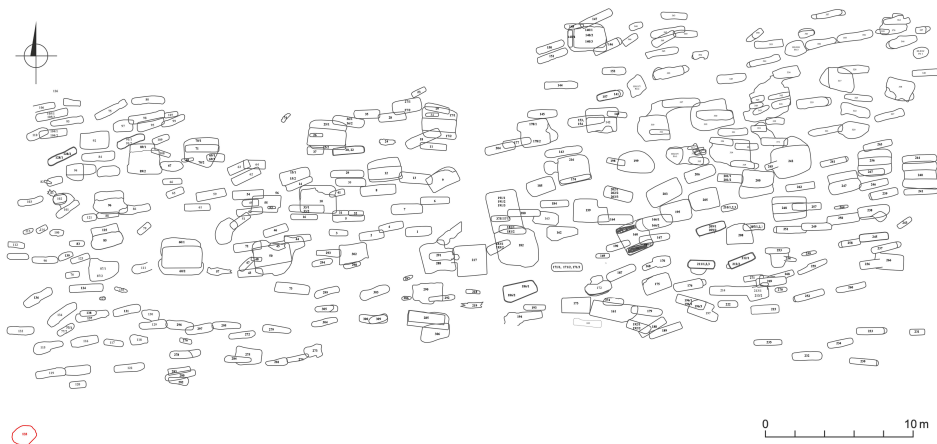


FIGURE 1

The Southern necropolis and the placement of the grave 133 (highlighted in red), courtesy the Russian Expedition to Deir el-Banat.



FIGURE 2

Grave 133 showing the human with the dogs and the vertical pieces of palm rib. Photo S.V. Ivanov.

Long brownish hair was preserved all over the skull. Fragments of the skin were preserved on some of the bones, especially on the feet. Excerebration was not performed as demonstrated by the intact ethmoid bone, while evisceration could not be confidently established as the body was poorly preserved, with some of the surviving parts of the skin and flesh crumbling away shortly after being exposed to the air. The discoloration and the crumbly texture of the several areas of the deposit suggests some degree of decomposition of internal organs, thus arguing against evisceration. While there were no visible traces of resin or natron, the body had possibly been anointed with oils that discoloured the remaining skin as well as the cloth that was on the body, a style of basic preservation attested for poorer burials (Smith & Dawson, 1991; Ikram & Dodson, 1998). Based on dentition and epiphyseal fusion, the child's age at death was 8-9 years (Vasiliev *et al.*, 2008). There were no signs of disease or violence found on the bones or the remaining soft tissue.

What might have been a linen hood was placed on the head, completely covering it, reaching to below the clavicles, and a linen tunic was placed over the body, as identified by textile specialist and team member Olga Orfinskaya (personal communication). The tunic extended to mid-thigh (middle of the femurs). A linen bandage, running horizontally around the body, secured the hands and arms to the trunk so that they would not become separated and disarticulated, as is common practice for human bodies in Egypt (Ikram personal observation).

DOG BURIALS IN GRAVE 133

Several dogs were buried around the child from its waist to the feet, as well as being situated below the child. The dogs lay in a pit with a diameter of approximately 1.50 m, and a depth of 0.50 m.

The animals did not appear to have been arranged in a specific order or orientation. The dogs were differentially preserved, most with skin and bits of fur present, some with only skin with no fur, a few that were mostly skeletonized, and others that were disarticulated. The preserved fur was yellowish-brown. The skeletons belonged to animals of different ages, from young puppies to old animals. Most of the dogs were articulated, although some -- particularly those of very young animals --

were disarticulated or incomplete, probably due to bioturbation and the fact that their bones are much more fragile than those of adults, and the connective tissues insufficiently strong to hold them together. The dogs were stacked in uneven layers. The disarticulated and loose bones of adult animals were more prevalent in the upper layer than the lower one.

There was no obvious evidence for artificial mummification by natron or other salts or of oils or resins on the dogs. Many of the dogs' bodies contained their internal organs, and in one animal remains of feces were found, these contained date pits and a donkey's/small horse's central tarsal bone. Some fish bones were identified in another dog's intestines. Thus, it seems that the dogs had dried naturally (Figures 3, 4), perhaps in the sand, or in the air. However, in a few instances a fine layer of dried clay or silt covered the dogs' bones. The clay or silt is not typical of the desert surrounding the site, which may imply some kind of intervention or that these dogs had previously been interred elsewhere before being buried at Deir el-Banat. The animals must have been exposed to the air at some point, as the area within and close to the deposit yielded puparia of fly nymphs and the larvae of dermestid beetles. Several dogs still retained some of their fur, with a yellow-beige being the most common, such as is frequently seen in "baladi" village dogs of today. A few dogs appear to have had brown fur.

The more intact animals were positioned in the common pose for dog mummies: seated on the haunches with the forepaws extended along the length of the body and the hind paws pushed up into the belly, the tail curving down between the hind legs and lying on the belly (Ikram & Iskander, 2002).

Some of the dogs had been bandaged in at least one layer of textile, which was preserved; in other cases, the linen's preservation was patchy or there was no evidence for it at all. Most of the dogs showed evidence of having been bound with strips of papyrus (*Cyperus papyrus* L.) stalk that created a sort of net around the animal. In the case of the linen-wrapped dogs the papyrus lashings were on top of the cloth, further securing it in place. Papyrus, best known for its use in manufacturing papyrus paper, as well as providing the raw materials for shoes, baskets, and mats (El Hadidi & Hamdy, 2011), was also used to wrap animal mummies (see examples from the Egyptian Museum, Cairo: CG 29661, CG 29676, CG 29728), including



FIGURE 3

Closeup of a dog with fur present and below a dog with its muzzle secured with papyrus. Photo S.V. Ivanov.



FIGURE 4

An articulated dog with skin and yellow fur alongside a partially skeletonized dog. Photo S.V. Ivanov.

canines (CG 29758), from different sites in Egypt (Ikram & Iskander, 2002). These 'nets' held each dog together and would also have made it easier to carry them. Notably, an effort had been made to tie the muzzles shut, securing the mandible to the skull (Figures 5 and 6). However, some specimens present the skull of one animal with the mandible of another. In a few cases, the mis-matched mandible is tied on backwards (Figure 7). Sometimes a wrapped corpse consisted of a whole or almost whole skeleton of one animal, to which some bones from other animals (two or more) of approximately the same age had been added. Such amalgam mummies are known from other sites throughout Egypt (Ikram, 2005, 2021). It should be noted that papyrus and reed mats were used to wrap dogs in the predynastic cemetery in Heliopolis (Debono & Mortensen, 1988: 40): matting remains were found with three dog burials, and two of the dogs had been buried with ceramic vessels (Van Neer, 2002: 533-535). It should be noted that burying dogs in pots is known from much later periods as well (Ikram, 2013c). Mats were also used to separate and cover layers of dog mummies, as was the case of the Roman era dog mummy deposit excavated

by Stephen Harvey at the Tetisheri monument at Abydos (Ikram personal observation).

METHODOLOGY FOR STUDYING THE FAUNAL REMAINS

During exhumation, separate whole and partial skeletons were put into different labelled packages in order to preserve the integrity of each individual animal. The following information was recorded for the bones: species, side, age, pathologies, taphonomy, and measurements.

For juveniles, age was estimated on the basis of tooth eruption and wear, and the epiphyseal fusion of long bones (Gipson *et al.*, 2000; Crockford, 2009). As age estimation based on bones is not precise, age ranges were compiled instead, using four age groups: <1.5 months; 1.5-3 months; 3-12 months; > 12 months (Table 2).

The bones of adult animals were measured following von den Driesch (1976), amended (Table 1). In young animals, only the maximum length of the elements was measured. Measurements were



FIGURE 5

The group of dogs, many of which still have vestiges of skin, fur and papyrus binding. Photo S.V. Ivanov.



FIGURE 6

Papyrus bindings in a loose net, with vestiges of textile in places. Photo S.V. Ivanov.

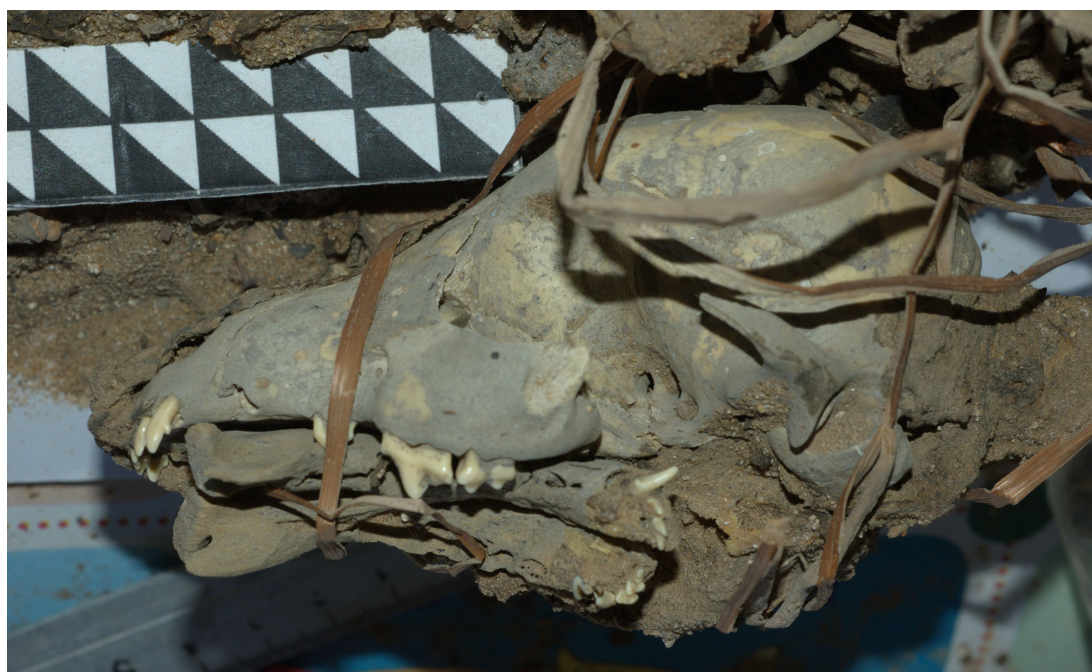


FIGURE 7

Puppy's skull with mandible tied to the skull backwards. Photo S.V. Ivanov.

# of dog	sex	Limb bones greatest length (mm)				
		Humerus	Ulna	Radius	Femur	Tibia
1		152.1 (R)	180.8 (R)	155 (R)	168.2 (R)	
3		164.0 (L)	194.3 (L)	165.4 (L)		
6		153.9 (L)	179.1 (L)	155.0 (L)	166.3 (L)	
		153.8 (R)		154.4 (R)	166.4 (R)	
9	male	174.0 (L)	204.2 (L)	176.7 (L)	193.0 (L)	
		173.6 (R)	210.1 (R)	177.6 (R)	197.3 (R)	
16		148.7 (L)	180.0 (L)	152.7 (L)	163.7 (L)	
		149.1 (R)	181.2 (R)	153.5 (R)	167.0 (R)	
28		150.3 (L)				
		150.8 (R)	173.6 (R)	150.6 (R)	176.0 (R)	
42		146.6 (R)	178.2 (R)	151.6 (R)		
42-1		146.8 (R)	176.8 (L)	151.3 (L)		
58	male?					179.3 (L)
87		169.6 (R)	171.3 (R)			
87-214		170.5 (L)		170.2 (L)	147.1 (L)	
89	male	176.4 (L)			205.2 (L)	
		177.5 (R)			204.2 (R)	
90		144.7 (L)		155.8 (L)	161.4 (L)	
		145.1 (R)	173.7 (R)	149.2 (R)	153.8 (R)	
107	male	158.2 (L)	185.8 (L)	157.8 (L)		
		158.8 (R)	184.8 (R)	156.9 (R)	167.8 (R)	
108		133.0 (L)	160.0 (L)	135.3 (L)	143.5 (L)	
			158.0 (R)	136.1 (R)	144.3 (R)	
135		140.9 (L)	165.2 (L)	142.1 (L)	156.0 (L)	
		141.3 (R)			159.4 (R)	
217		137.8 (L)	160.6 (L)	137.6 (L)	154.0 (L)	
		137.4 (R)			153.3 (R)	

TABLE 1

Measurements of the limb bones of adult dogs from Grave 133 at Deir el-Banat. The side of the body is indicated in parentheses, L – left, R – right.

made with a caliper with an accuracy of 0.10 mm and a spreading caliper for skull external measurements with an accuracy of 1 mm.

Age groups	Animals	
	No. of specimens	%
< 1.5 months	47	33
1.5 – 3 months	52	37
3 – 12 months	24	17
> 12 months	19	13
Total	142	100

TABLE 2

Age structure of dogs buried in Grave 133 at Deir el-Banat.

Measurements of the greatest lengths of all limbs were used to calculate the shoulder height

by Harcourt’s (1974) formulas: $SH = 3.43 \times [\text{humerus length}] - 26.54$, $SH = 3.18 \times [\text{radius length}] + 19.51$, $SH = 2.78 \times [\text{ulna length}] + 6.21$, $SH = 3.14 \times [\text{femur length}] - 12.96$ and $SH = 2.92 \times [\text{tibia length}] + 9.41$. The same measurements of limb bones were used to calculate the weight using the Losey method (Losey *et al.*, 2015, 2017), by the formula $\ln(\text{weight}) = \alpha + \beta \cdot \ln(\text{great length})$, α the constant, β the regression coefficient, according to Losey’s tables. We did not use tibia for calculation (except for dog #58, where the tibia was the single bone accessible for measuring), because of the weak correlation of tibia with body size (Losey *et al.*, 2015, 2017).

Due to the fact that not all the skeletons discovered appeared to be complete, and “extra” elements related to a particular animal were noted from time

to time, the calculation of the actual number of buried dogs was difficult. Standard methods accepted in archaeozoology were applied (Bökönyi, 1969). The method of calculating the Minimum Number of Individuals (MNI) is used in the case of mass burials or clusters with a high probability of finding skeletal elements from the same animal. The MNI calculation is based on counting an anatomical element from a certain side of the body that is maximally represented in the osteological sample. This number was adjusted based on bone size: for example, the left humerus was the most common in the sample, numbering 100. The lengths of these humeri vary from 10 to 100 mm; however, three bones longer than 100 mm were found in the right humeri sample, and consequently, the MNI was adjusted to 103. And for example, if five skulls of old animals were found, provided that there were neither right nor left humeri of very mature animals, then 5 more animals would have been added to bring the final MNI to 108.

The method of gender determination based on skeletal remains is poorly developed so far. The only accurate indicator is the presence or absence of a genital bone (*os penis*, *os baculum*), which is present only in adult males. However, as the bone is fragile, delicate, and easily destroyed, its absence does not automatically indicate a female, though its presence clearly indicates a male. Five baculi of adult dogs were found in the excavation site, indicating the presence of the remains of at least five undisputed males. As most of the skeletons were articulated or semi-articulated, we did not use Ruscillo's table test to establish sex (Ruscillo, 2006).

RESULTS

The MNI was established as 142, using the humeri. In our study, the age of individuals was determined based on dentition (skulls and jaws, i.e., 102 skulls and 199 jaws, 105 left and 94 right that did not fit with the left side). We established the age for all 142 animals (Table 2). Since not all of the 134 humeri were part of the skeleton with the

preserved skull or jaw, ranges of humerus lengths corresponding to each age group were established. Thus, all humeri of known sizes and skulls that served as the basis for calculating MNI were assigned an age range (Table 2). This allowed us to build

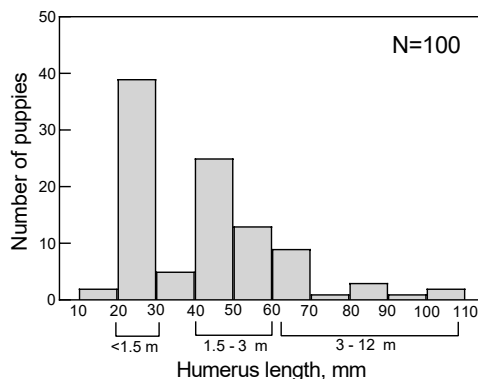


FIGURE 8

Humerus length frequency in sexually immature animals (younger than 12 months).

the frequency distribution of right humeri lengths of sexually immature dogs (Figure 8). Two peaks are clearly visible, which in accordance with our age determination method correspond to animals of approximately 20 days and animals from 1.5 to 3 months old.

The prevalence of young animals (less than a year) (87%) compared to adults (13%) is evident. Animals older than three months make up only 30% of the entire sample, and 70% are puppies under the age of three months. No animal showed any signs of violent death, although if puppies were drowned or starved, the bones would show no evidence of this. This mortality profile is in keeping with what has been found at other dog burial sites, such as the Catacombs of Anubis, which was originally the site of an estimated eight million canine burials (Ikram & Bertini, 2021), as well as at Asyut (Kitagawa, 2016, 2019).

Based on bone measurements (see Table 1), the shoulder height and the weight of 17 adult dogs were calculated (Table 3 and Figure 9). The ran-

	Number of dogs	Mean value	Min.	Max.	Standard deviation
Shoulder height (cm)	17	52.2	44.6	60.4	4.26
Weight (kg)	17	17.1	10.6	23.4	3.80

TABLE 3

Height and weight of the Deir el-Banat dogs.

ge of sizes and weights varies considerably, with weights being from 10.6 kg to 23.4 kg, and shoulder height from 44.6 cm to 60.4 cm. The weight average value was 17.1 ± 0.9 kg, and height, 52.2 ± 1.4 cm.

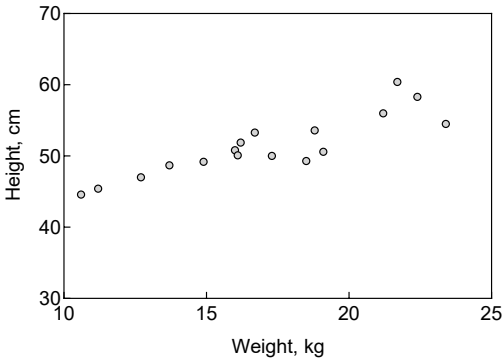


FIGURE 9

The height vs. weight of dogs from Deir el-Banat.

Beside dog bones, five fragments of caudal vertebrae and one mandible of a rodent were found at the excavation site. In addition, as mentioned above, an equid's central tarsal bone and some fish bones were found among the intestinal contents of several dogs, in addition to date pits.

DATING THE ASSEMBLAGE

A comprehensive study of the burial assemblages that surrounded Grave 133 at the southwestern edge of the necropolis and that were located at the same level was carried out. All were of humans dating to the Roman era, from the 1st century BC to the 4th century AD (Belova, 2021), based on ceramics and grave goods. The linen cloth found on the child as well as two linen bandages connected by a knot, found on one of the dogs (No. 107) date to Roman times (2010/0001/001, 2010/0001/002). Thus, based on artefacts found in neighboring graves it could be assumed that Grave 133 was made between the first century BC and the first century AD.

DOG DEMOGRAPHICS AND THEIR POSSIBLE INTERPRETATION

The age structure of the dog burials under study is notable for being very skewed toward young ani-

mals. This is typical neither of wild dog populations nor of free-living domestic dogs (Smirnov & Korytin, 1985; Macpherson *et al.*, 2000; Totton *et al.*, 2010; Gsell *et al.*, 2012: 236). A more normal demographic was found in cemeteries with mixed human and dog burials, such as the predynastic Elite Cemetery HK6 in Hierakonpolis. Here, the majority of dogs buried with humans were adults—51 out of 71 (Van Neer *et al.*, 2004), 72% adult as opposed to the 13% of Deir el-Banat.

The Deir el-Banat assemblage appears to be a single deposit. There are a few possible explanations for its makeup: dogs could have been collected in the vicinity, with puppies being preferable as they are weaker and easier to catch. Also, puppies have a higher mortality rate than just-mature individuals, so they might have been collected post-mortem (Beck, 2002). However, finding 123 puppies in a short period of time seems unfeasible unless they were especially bred for the purpose.

Scholars working on votive mummy deposits have posited that dogs could have been bred for religious purposes, particularly sacrifice (Ikram *et al.*, 2013; Ikram & Bertini, 2021), thereby providing a source for young animals that were plentiful and easy to kill (many methods would leave no mark on the bones: drowning, withdrawing care, poisoning). In modern populations, overall mean litter size at birth has been reported as being 5 to 6 (Borge *et al.*, 2011; Wallis, 2020). Mean litter size increases with breed size, from 3.5 ± 0.04 puppies in miniature breeds to 7.1 ± 0.13 puppies in giant breeds; the inter-estrus intervals range from 8 to 10 months, gestation length is 63 days (Wallis, 2020). Thus, in normal circumstances bitches whelp once a year, bearing from 4 to 7 puppies, depending on the breed. To produce 123 puppies, approximately 21 bitches would be needed.

In wild canines, mating and subsequent birth and feeding in sexually mature females occurs at approximately the same time. In domestic dogs, mostly due to constant favorable living conditions, this synchronism is broken, and is regulated more by individual factors of diet, environment, and the presence or absence of other animals of the same species. However, the reproductive cycle synchronization in animals or humans living together has been noted, the so-called McClintock effect (McClintock, 1971; Kutzler, 2007). Taking the size of the humeri of the animals into consideration (Figure 8), together with the likelihood of synchronization, it would seem that at least two breeding

centres were required to produce the 123 puppies at Deir el-Banat, as can be seen from Figure 8, where a distinct interval between the peaks of age indicates different groups of whelping females.

Given the tradition of animal sacrifice in the case of dogs as votive mummies (Ikram *et al.* 2013; Ikram & Bertini, 2021) and the demographic distribution of the Deir el-Banat dogs, it is probable that the animals came from a breeding area or kennels that supplied a temple or temples with dogs.

ON THE QUESTION OF TYPES OF EGYPTIAN DOGS

Dog breeds are impossible to determine in antiquity although phenotypes can be established from images in Egyptian art, and some differences (morphotypes) can be established based on size and skull morphology (for dog types in Egypt, see Lortet & Gaillard, 1907; Rice, 2006; Dunand *et al.*, 2015, 2017; Kitagawa, 2016; Ikram & Bertini, 2021; dog morphotypes in general Bennett & Timm, 2016; Baxter, 2009). One of the first studies dedicated to the remains of Egyptian dogs is the pioneering work of Lortet & Gaillard (1907), who examined a number of dog mummies, images of dogs from ancient Egypt, as well as the (then) contemporary living canine population in Egypt. According to their morphometric studies, the authors identified four dog types:

“Egyptian pariah”; “Tesem” a greyhound-like dog; “Egyptian dog”, which is larger than the Egyptian pariah, and with a shorter skull; and “Egyptian Spitz”, described on the basis of one skull only. It should be noted that most of the dog mummies studied, including those examined by Gaillard & Daressy (1905), were collected from a variety of sites (Nicolotti & Postel, 1994; Ikram, 2020). However, the fact that a limited sample, originating from several sites from different time periods were used to compile the data, has engendered criticism of their methodology and results (Ducos, 1971). Current scholarship has increased the number of phenotypes based both on skull morphology as well as size (Churcher, 1993; Kitagawa, 2016; Dunand *et al.*, 2019; Ikram & Bertini, 2021), noting the variety in the ‘pariah’ type, in order to accommodate fresh data (Haddon, 1914; Churcher, 1993; Wapnish & Hesse, 1993; Chaix, 1999). For comparison of Fayum dogs with other ancient and modern dogs of Egypt and adjacent territories, we used the data of other authors (Table 4, Figure 10).

The Deir el-Banat dogs varied considerably in both weight (there were four large animals that would have weighed 20 kg) and height, which is also common in other canine assemblages of the Roman era (Bökönyi, 1984; MacKinnon, 2010). We used the non-parametric Kruskal-Wallis test to compare dog sizes from different locations and periods. The test showed that there was a difference between the analyzed samples (P value <0.0001,

Place of origin of the material	Time period	Number of individuals	Height, cm Mean ± SD	References
Hierakonpolis	3800–3600 BC	5	45.7 ± 1.4	Van Neer <i>et al.</i> , 2017
Asyût	2450-2250 BC	8	50.3 ± 4.3	Gaillard & Daressy, 1905
Kerma	2700-1500 BC	18	53.6 ± 3.6	Chaix, 1999
Ashkelon	500-300 BC	15	53.2 ± 3.6	Wapnish & Hesse, 1993
Beirut	540-330 BC	11	53.0 ± 3.9	Hourani, 2018
Catacombs of Anubis At North Saqqara	450 BC	99	47.7 ± 5.6	Ikram & Bertini, 2021
Balat and Elephantine	450-50 BC	11	48.7 ± 3.9	Boessneck, 1980; Boessneck & Driesch, 1982; Chaix & Olive, 1986; Churcher, 1993
Gebel Asyut al-gharbi	250-150 BC	23	52.1 ± 4.2	Kitagawa, 2016
Roda	250-50 BC	13	50.0 ± 4.1	Lortet & Gaillard, 1903
Abydos	30BC-320AD	3	51.5 ± 6.3	Haddon, 1914
Berenice	100-200AD	13	45.7 ± 8.8	Osypinska & Osypinski, 2017; Osypinska <i>et al.</i> , 2020
Northern Sudan	modern	26	54.2 ± 4.1	Haddon, 1914; Chaix, 1999

TABLE 4

Comparative data for dog heights derived from other authors used in the study.

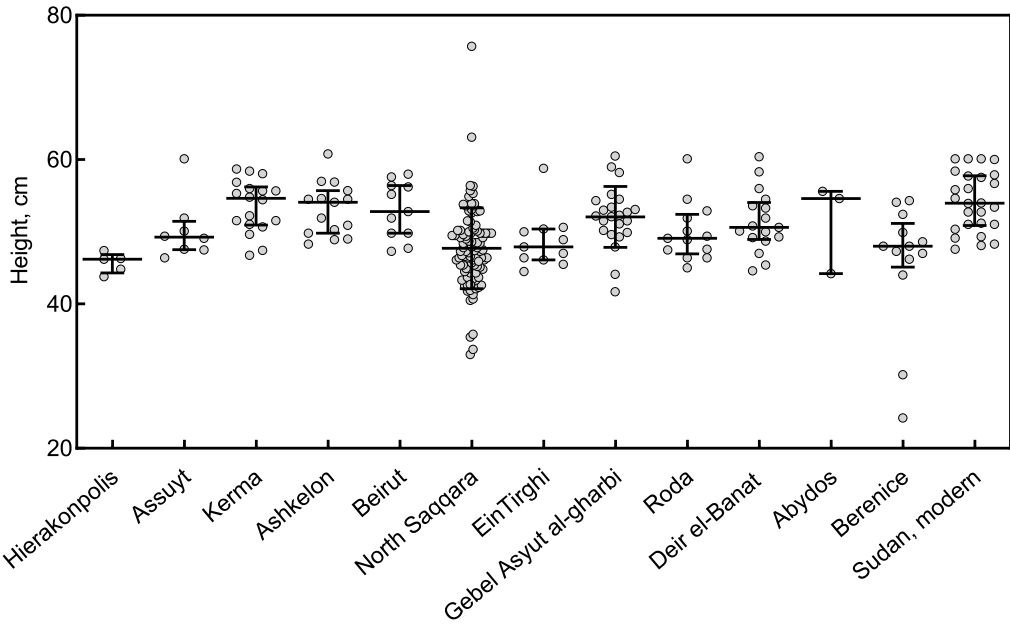


FIGURE 10

Calculated heights of ancient dogs from different localities compared to those from Deir el-Banat. The locations are arranged in the order of periods from most ancient to modern. Black lines – median with interquartile range and gray circles – individuals.

Kruskal-Wallis statistic 78.47). The results of further multiple comparisons are presented in Table 5. The dog population from North Saqqara differs statistically with four populations of dogs – from Kerma, Askelon, Beirut, and Gebel Asyut al-Gharbi, possibly as the sample size is dramatically different. The average values of Fayum are very close to ancient and modern Sudanese dogs, modern Egyptian pariahs and ancient Israeli dogs from Ashkelon. Ancient Egyptian dogs from Hierakonpolis (c. 3400-3000 BC) and Balat (c. 2345-2181 BC), both sites of early dates, appear to be the smallest.

DISCUSSION AND CONCLUSION

Dogs were the first animals to be domesticated, and the canine-human bond is probably the most profound of all inter-species relationships, as is attested by the presence of dog and dog-human burials found throughout the world (Morey, 2006, 2010; Morey & Jeger, 2022). This is no different in Egypt where dogs played a crucial part in the lives of the ancient Egyptians, as is evidenced by texts and two- and three-dimensional images showing them in a variety of roles (Houtart, 1934; Rice, 2006; Brewer *et al.*, 2002). They served as

Dunn's multiple comparisons test	Mean rank diff.	Adjusted P Value
Kerma vs. Hierakonpolis	140	0,02
Kerma vs. North Saqqara	94,95	<0,0001
Beirut vs. North Saqqara	82,91	0,0449
Hierakonpolis vs. Sudan, modern	-143,3	0,0084
Berenice vs. Sudan, modern	-97	0,0128
Ashkelon vs. North Saqqara	87,33	0,0025
North Saqqara vs. Gebel Asyut al-gharbi	-72,12	0,0031

TABLE 5

The result of multiple comparisons in different groups of dogs. Only results with a significant difference between sizes are shown.

guardians and companions, played an active role in hunting and herding, and often combined functions (Fischer, 1961; Houlihan, 1996: 44-45, 64; Hendrickx *et al.*, 2009; Barbash, 2013: 37; Ikram & Dodson, 1998: 131). Canines also played a significant role in religion. They were associated with deities such as Anubis, god of embalming, who also helped navigate between this world and the next, and Wepwawet, who was a pathfinder and guided travellers as well as the dead (Wilkinson, 2005). Also, as elsewhere, dogs were buried both alone and with humans.

Dog burials are attested in Egypt from the Predynastic onward (for overviews, see Flores, 2003; Ikram, 2013a; Hartley, 2015; for specific examples, see Van Neer *et al.*, 2004; Friedman, 2011; Friedman *et al.*, 2011), in different contexts: within settlements, in animal cemeteries or catacombs, canine graves mixed in with those of humans, in association with a single human or a group of people, and at the edges of human cemeteries. The majority of dog burials that survive in Egypt are votive offerings, given to Anubis in particular. Instead of giving a statue or stela, the pious would give a mummy, which was not only long-lasting but more valuable as it would represent the sacrifice of a living creature that was in the god's image and one of the god's totemic animals. Such interments, frequently mass burials numbering in the hundreds of thousands as at Saqqara, Asyut, el-Deir, and Abydos (Peet & Loat, 1913: 42-46; Peet, 1914: 40-47; Brunton, 1948: 91; Ikram, 2005; Kaiser, 2011; Ikram, 2013 a, b, c; Ikram *et al.*, 2013; Dunand *et al.*, 2015, 2017: 25-128; Nicholson *et al.*, 2015; Kitigawa, 2016; Nicholson, 2021), are common from the Late Period through the Roman era.

Far fewer burials of companion animals survive, be they single, double or triple associated with individual humans. However, the high number of representations of people with their dogs suggests that such burials would have been plentiful (Handoussa, 1986; Schulz, 2006; Zahradnik, 2009; Miles, 2010; Pischikova, 2010; Brixhe, 2018; Polz, 2020). Amongst the earliest surviving of such interments are those associated with the royal graves at Abydos (Emery, 1956; Dreyer *et al.*, 2000: table 4; Dreyer, 2005: 124), Grave 3128 at Matmar (Brunton, 1948: 22), Grave H23 at El Mahasna (Ayrton & Loat, 1911: 21), Grave N7418 at Nag ed Deir (Lythgoe, 1965: 252-254), Tomb 14 at Hierakonpolis (Friedman *et al.*, 2011), the grave of of Hapimen at Abydos (Petrie, 1902: 40),

and possibly the tomb of the dog Abuwtiyuw at Giza (Reisner, 1936), as well as one at Beni Hasan (Tooley, 1988). There is even an instance of dedicated pet cemeteries in the Graeco-Roman era (Osypinska & Osypinski, 2017; Osypinska *et al.*, 2020). The practice of companion animal burials also has been documented in the Sudan in burials at Kerma, where there were also some variations in the human-dog burials: in Kerma, some dogs were buried at the head of a flock of sheep and goats (e.g., in Tomb 238), symbolically continuing their job as herd-dogs after death, as well as providing companionship to their owner (Chaix, 1999), whom they could also accompany on hunts in the hereafter.

In the Naqada II settlement of Adaïma, five individual dog burials were found surrounding the settlement area, and it was suggested that these dogs may have been buried as foundation deposits, with the dogs perhaps providing a protective role for the settlement in death as they had in life (Van Neer, 2002). Quite possibly they played a similar role in some cemetery or burial situations, serving as "amuletic" (Hartley *et al.*, 2011: 28; further explored in: Ikram, 2013a; Colin *et al.*, 2014) or guardian burials, evoking Anubis in his role of protector of the necropolis.

Other examples of dog and human burials come from different cultural contexts in the Sudan. In cemetery C at Kadada (Sudan) a dog had been placed directly at the bottom of a pit and the human had been placed on top of it, while in a number of other instances dogs were located above the head of the deceased, pressed up against the wall of the pit, with legs facing outward. The excavators have generally identified the dogs as being pets or work/companion animals of the deceased, deliberately slaughtered upon their owners' death (Bonnet *et al.*, 1989: 27).

The assemblage at Deir al-Banat, while carefully deposited with both animals and child benefiting from the rudimentary mummification found in poorer burials of this period, is very different from what are clearly burials of beloved and useful pets. It is also unlike the usual votive deposits of dogs in that there is an associated human burial. Of course, it is possible that the child was buried on top of and amidst the dogs by chance, although this does not seem likely, given their proximity and positioning. It seems more likely that there is some relationship between the two species.

Deposits at Baharia Oasis, Saqqara, and Hierakonpolis provide potential parallels, or at least share some similarities with the Deir el-Banat assemblage (Hartley *et al.*, 2011; Adam & Colin, 2012; Colin *et al.*, 2014). The Qasr ‘Allam necropolis (Bahariya oasis), active from the Late Period to early Ptolemaic times, contained one area of human burials juxtaposed with those of un-mummified dogs, mainly adult animals, as well as a few other species, within the cells composing the structure of the foundation for a platform (Colin *et al.*, 2014: 34). The excavators proposed a novel interpretation focusing not only around Anubis’s traditional role as an embalmer, protector, and guide for the dead but also on Anubis’s role at celebrating the birth of a young god or king, as depicted in *mammisis* (birth houses, attached to temples, and meant for royal and divine births), and thus supporting rebirth in the afterworld (Colin *et al.*, 2014: 46–60).

At the Teti cemetery in Saqqara, a shaft led to a series of chambers that contained human burials with dogs near the doors of each chamber. The excavators posited that the dogs served as “amuletic” or protective burials (Hartley *et al.*, 2011). These burials date to the Graeco-Roman era, and thus they are relatively close in time to those from Deir el-Banat. However, in the Deir el-Banat deposit animals far outnumber the solitary human—indeed, the child is almost an amulet for the dogs!

The closest parallel to the Deir el-Banat assemblage in terms of combination of humans and dogs, although the most chronologically distant, comes from Hierakonpolis’s Predynastic Elite cemetery HK6 (c. 3400–3000 BC), although it should be noted that all the graves here had been disturbed (Renée Friedman, personal communication, 2023). In this cemetery twelve dogs were found in Tomb 71 accompanying a young child (7 to 10 years of age) of indeterminate or undetermined sex (Friedman, 2013). The dogs had shoulder heights between 47 and 56 cm. Significant amounts of fabric were also found, together with several lengths of twisted leather mixed in with the dog bones. The fabric might have served as wrapping, and the twisted leather has been interpreted as the remains of the dogs’ leashes. As yet, the excavators have not established the precise meaning of this (Friedman *et al.*, 2017: esp. 271). Tomb 14 contained six dogs and a juvenile human of between 10 and 15 years of age (Friedman *et al.*, 2011: 173, 181). Tomb 48 contained 10 dogs, some of which were found in situ, placed around the circular tomb’s edges, and

probably one human, although this was unclear due to the disturbed nature of the deposit (Friedman *et al.*, 2017: 237). Tomb 82 in the same cemetery contained two adolescent humans and three dogs, together with what are probably their leashes (Friedman & Droux, 2018). This might have been a single tomb or a group of individual graves, but was very disturbed, so the details are unclear in terms of numbers of humans who might have been buried there, though the number of dogs is clearly established (Droux *et al.*, In preparation; R. Friedman, personal communication, 2023). For these burials too, the relationship between the humans and the animals remains unclear. Thus, it seems that at the beginning of Egyptian history, multiple dog burials with a single or multiple humans was a tradition that seems to have vanished (or is lost in the archaeological record) until the Graeco-Roman era. None of these Predynastic burials boasts as many dogs as the Deir el-Banat deposit.

If the Deir el-Banat assemblage is not one of pet/companion dogs or votive offerings, and does not share enough similarities (particularly in terms of the proportions of dogs to human) with the “amuletic” or resurrector companions from Baharia and the Teti cemetery, one must consider alternative explanations for this grouping.

The Kadruka burials that have been interpreted as guardians of the cemetery occur at the cardinal points, but unlike the Deir el-Banat one, these only consist of pairs of dogs with no humans. Future excavations in the other corners of Deir el-Banat may answer this question—though it is possible that such graves have been lost in the course of robberies or illegal excavations. Friedman (2010: 72) has tentatively proposed that graves of multiple animals without grave goods might serve as markers of boundaries of sacred areas, where the animals serve as spiritual guardians and/or protectors, which is a feasible explanation for the Deir el-Banat burial.

The deposit might reflect some sort of magico-religious ritual involving sacrifice, perhaps even one associated with healing, and one that is not Egyptian but Greek or even Roman in origin. Greek and Roman culture permeated Egypt at this time and Ptolemaic and Roman Egypt was a very cosmopolitan and ethnically rich country (Thompson, 2009: 401; Belova & Ivanov, 2019: 2; Malleon, 2019: 125), with mingling multiple religious traditions (Perpillou-Thomas, 1993; Frankfurter, 1998). Pliny records Greek and Roman religious

rites associated with dogs—some involving canine sacrifice. These include Robigalia (relating to the setting of Sirius the Dog Star), Lupercalia, and Suovitaurlia, at which dogs (sometimes together with other animals) were sacrificed (Pliny, 1856: IV, 98-99; Plutarch, 1965; Wilkens, 2003; De Grossi Mazzoni & Minniti, 2006). Pliny also mentions a dog sacrifice during the Roman festival of Genita Mana, a goddess who protected children (Pliny, 1856: XXIX, 58). Conceivably, this child was sick and several dogs were offered in order to save it, albeit unsuccessfully. The location of the deposit at the edge of the cemetery would be appropriate if the child suffered from an ailment so unusual and lethal that it warranted the sacrifice of 142 dogs. Roman texts also mention dog meat as a *materia medica*, but this does not seem to be the case here (Pliny, 1856: VIII, 40). Some other Roman and Greek burial rites are recorded in which dogs were buried together with humans, though not in the number as those found in the Deir el-Banat deposit. Thus, as the Deir al-Banat burial is of the Roman era, possibly the deposit reflects a Roman rather than an Egyptian tradition, with basic mummification being part of an acculturation process.

While it is unlikely that the assemblage consists of a pack of animals that belonged to the child, it is more conceivable that the dogs and the child belonged to a single family—perhaps one that worked with dogs in either a sacred context (raising them for temple sacrifice or as guardians) or a secular context (hunting or herding). The fly-infestation, lack of proper mummification, and the incompleteness of some of the animals could thus be interpreted as the result of an unforeseen catastrophe that resulted in the hasty preparation and burial of both the animals and the child. Although a rare occurrence, even this area in the Fayum can flood, as has been recorded in recent times (Day, 1984; Soren, 1999). Possibly an abnormally high flood inundated some areas where enclosed dog breeding areas were situated, trapping the animals and leading to their demise. The demographic profile argues against a natural grouping of dogs that died by drowning. It should be noted that an “Island of Dogs” is mentioned in one of the Fayum Demotic Papyri found at the site of Dime, located at the northwest end of Lake Qarun (Lippert & Schentuleit, 2006); however, there is no evidence that it had anything to do with dog-raising for offerings, especially as most of the Fayum cult sites are related to

crocodile worship. It can also be posited that dogs separated from their mothers and kept in an enclosure in preparation for mummification had fallen prey to some natural catastrophe and were buried as a group. Disease that leaves no marks on the bone could also be responsible for the deaths of the animals and the child. Ultimately, there are many possible explanations for this deposit. Indeed, its unique nature and the unusually large number of dogs (142) buried with a single human raises perplexing questions about human-canine relationships in ancient Egypt.

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