



When did roosters start singing at Arslantepe?
A preliminary assessment of the presence
and spread of *Gallus gallus* (Linnaeus, 1758)
in Iron Age Eastern Anatolia

Giovanni SIRACUSANO,
Federico MANUELLI & Marco MASSETI

DIRECTEUR DE LA PUBLICATION / *PUBLICATION DIRECTOR*: Bruno David
Président du Muséum national d'Histoire naturelle

RÉDACTRICE EN CHEF / *EDITOR-IN-CHIEF*: Joséphine Lesur

RÉDACTRICE / *EDITOR*: Christine Lefèvre

RESPONSABLE DES ACTUALITÉS SCIENTIFIQUES / *RESPONSIBLE FOR SCIENTIFIC NEWS*: Rémi Berthon

ASSISTANTE DE RÉDACTION / *ASSISTANT EDITOR*: Emmanuelle Rocklin (anthropo@mnhn.fr)

MISE EN PAGE / *PAGE LAYOUT*: Emmanuelle Rocklin, Inist-CNRS

COMITÉ SCIENTIFIQUE / *SCIENTIFIC BOARD*:

Louis Chaix (Muséum d'Histoire naturelle, Genève, Suisse)
Jean-Pierre Digard (CNRS, Ivry-sur-Seine, France)
Allowen Evin (Muséum national d'Histoire naturelle, Paris, France)
Bernard Faye (Cirad, Montpellier, France)
Carole Ferret (Laboratoire d'Anthropologie Sociale, Paris, France)
Giacomo Giacobini (Università di Torino, Turin, Italie)
Lionel Gourichon (Université de Nice, Nice, France)
Véronique Laroulandie (CNRS, Université de Bordeaux 1, France)
Stavros Lazaris (Orient & Méditerranée, Collège de France – CNRS – Sorbonne Université, Paris, France)
Nicolas Lescureux (Centre d'Écologie fonctionnelle et évolutive, Montpellier, France)
Marco Masseti (University of Florence, Italy)
Georges Métaillé (Muséum national d'Histoire naturelle, Paris, France)
Diego Moreno (Università di Genova, Gènes, Italie)
François Moutou (Boulogne-Billancourt, France)
Marcel Otte (Université de Liège, Liège, Belgique)
Joris Peters (Universität München, Munich, Allemagne)
François Poplin (Muséum national d'Histoire naturelle, Paris, France)
Jean Trinquier (École Normale Supérieure, Paris, France)
Baudouin Van Den Abeele (Université Catholique de Louvain, Louvain, Belgique)
Christophe Vendries (Université de Rennes 2, Rennes, France)
Denis Vialou (Muséum national d'Histoire naturelle, Paris, France)
Jean-Denis Vigne (Muséum national d'Histoire naturelle, Paris, France)
Arnaud Zucker (Université de Nice, Nice, France)

COUVERTURE / *COVER*:

Un coq dans les herbes / *Rooster in grass*. Photo credits: Fir0002/Flagstaffotos, Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Rooster04_ad-justed.jpg, dernière consultation le 19 octobre 2021.

Anthropozoologica est indexé dans / *Anthropozoologica is indexed in*:

- Social Sciences Citation Index
- Arts & Humanities Citation Index
- Current Contents - Social & Behavioral Sciences
- Current Contents - Arts & Humanities
- Zoological Record
- BIOSIS Previews
- Initial list de l'European Science Foundation (ESF)
- Norwegian Social Science Data Services (NSD)
- Research Bible

Anthropozoologica est distribué en version électronique par / *Anthropozoologica is distributed electronically by*:

- BioOne® (<https://www.bioone.org>)

Anthropozoologica est une revue en flux continu publiée par les Publications scientifiques du Muséum, Paris, avec le soutien du CNRS.

Anthropozoologica is a fast track journal published by the Museum Science Press, Paris, with the support of the CNRS.

Les Publications scientifiques du Muséum publient aussi / *The Museum Science Press also publish*: *Adansonia*, *Zoosystema*, *Geodiversitas*, *European Journal of Taxonomy*, *Naturae*, *Cryptogamie* sous-sections *Algologie*, *Bryologie*, *Mycologie*, *Comptes Rendus Palevol*.

Diffusion – Publications scientifiques Muséum national d'Histoire naturelle
CP 41 – 57 rue Cuvier F-75231 Paris cedex 05 (France)
Tél.: 33 (0)1 40 79 48 05 / Fax: 33 (0)1 40 79 38 40
diff.pub@mnhn.fr / <https://sciencepress.mnhn.fr>

© Publications scientifiques du Muséum national d'Histoire naturelle, Paris, 2021
ISSN (imprimé / *print*): 0761-3032 / ISSN (électronique / *electronic*): 2107-08817

When did roosters start singing at Arslantepe? A preliminary assessment of the presence and spread of *Gallus gallus* (Linnaeus, 1758) in Iron Age Eastern Anatolia

Giovanni SIRACUSANO

Missione Archeologica Italiana in Anatolia Orientale (MAIAO),
Sapienza Università di Roma, via dei Volsci 122, I-00185 Rome (Italy)
sir_gianni@libero.it

Federico MANUELLI

Institute of Heritage Science, Italian National Research Council (ISPC-CNR),
P.O. Box 10, I-00015 Monterotondo Scalo, Rome (Italy)
and Institut für Altorientalistik, Freie Universität Berlin,
Fabeckstraße 23-25, D-14195 Berlin (Germany)
federico.manuelli@cnr.it

Marco MASSETI

Department of Biology of the University of Florence,
via del Proconsolo 12, I-50122 Firenze (Italy)
marcomasseti55@gmail.com

Submitted on 16 June 2020 | Accepted on 26 October 2020 | Published on 19 November 2021

Siracusano G., Manuelli F. & Masseti M. 2021. — When did roosters start singing at Arslantepe? A preliminary assessment of the presence and spread of *Gallus gallus* (Linnaeus, 1758) in Iron Age Eastern Anatolia. *Anthropozoologica* 56 (16): 241-251. <https://doi.org/10.5252/anthropozoologica2021v56a16>. <http://anthropozoologica.com/56/16>

ABSTRACT

Among the faunal remains brought to light in the recent Iron Age excavations at the site of Arslantepe (South-East Turkey), the discovery of the bones belonging to an adult rooster is of particular interest. The red junglefowl, *Gallus gallus* (Linnaeus, 1758), is not autochthonous of Anatolia; the species is native to and was originally domesticated in south-eastern Asia, reaching the Mesopotamian region only at the beginning of the 3rd millennium BC. Throughout the Bronze Age and up to the beginning of the Iron Age the evidence of domestic junglefowl remains sporadic. However, from the second half of the 2nd millennium BC onwards, findings became more consistent, allowing us to trace its spread and evolution. The discovery of the first rooster at Arslantepe, in a level dated to the very beginning of the 1st millennium BC, fits with the general development of this species into the Near East and from here, during the advanced Iron Age, to the Mediterranean and to the West. The article aims at integrating this discovery into its geographical, cultural, chronological, and zoological background. Moreover, the discussion is broadened within the complex scenario of the development of the Iron Age Syro-Anatolian societies. We argue that the scarcity of chicken remains until the beginning of the 1st millennium BC might not be only related to taphonomic conditions but also to the fact that the species was an exotic rarity with possibly some sort of symbolic relevance.

KEY WORDS

Hittite,
Near East,
domestic chicken.

RÉSUMÉ

Quand les coqs ont-ils commencé à chanter à Arslantepe? Une évaluation préliminaire de la présence et propagation de Gallus gallus (Linnaeus, 1758) durant l'âge du fer en Anatolie orientale.

La découverte des os d'un coq adulte parmi les restes de faune mis à jour lors des récentes fouilles de l'âge du fer sur le site d'Arslantepe (sud-est de la Turquie) est particulièrement intéressante. Le coq sauvage rouge, *Gallus gallus* (Linnaeus, 1758), n'est pas autochtone de l'Anatolie; l'espèce est originaire et a été domestiquée en Asie du Sud-Est, n'atteignant la région mésopotamienne qu'au début du troisième millénaire avant J.-C. Les preuves de la présence de poules domestiques tout au long de l'âge du bronze et jusqu'au début de l'âge du fer restent sporadiques. Toutefois, à partir de la deuxième moitié du deuxième millénaire avant J.-C., les trouvailles deviennent plus concordantes, ce qui nous permet de retracer sa propagation et son évolution. La découverte du premier coq à Arslantepe, dans un niveau du tout début du premier millénaire avant J.-C., s'inscrit dans le développement général de cette espèce au Proche-Orient et de là, au cours de l'âge du fer avancé, vers la Méditerranée et l'Ouest. L'article vise à intégrer cette découverte dans ses contextes géographique, culturel, chronologique et zoologique. En outre, la discussion est élargie dans le cadre du scénario complexe du développement des sociétés syro-anatoliennes de l'âge du fer. Nous avançons que la rareté des restes de poule jusqu'au début du premier millénaire avant J.-C. pourrait être liée, non seulement aux conditions taphonomiques, mais aussi au fait que l'espèce était une rareté exotique, avec peut-être une dimension symbolique.

MOTS CLÉS
Hittite,
Proche-Orient,
poule domestique.

INTRODUCTION

Arslantepe is located in south-eastern Anatolia in the Upper Euphrates region about 12 km south of the river. The site lies in the fertile Malatya plain at 912 m above sea level (Fig. 1). The Euphrates links the Malatya plain to Syria and Mesopotamia and also separates it from the area to its east, the Elazığ region (Brown & Wilkinson 2017: 147-149). Over the centuries, this enabled the interaction with the Anatolian, the Syro-Mesopotamian and Transcaucasian worlds and the penetration of foreign influences (Frangipane & Liverani 2013: 350).

Arslantepe is the largest and the main mound of the region. The Italian Archaeological Expedition in Eastern Anatolia (MAIAO) has been working at the site since the beginning of the 1960s. The continuity of the excavations allowed the reconstruction over the years of a detailed and uninterrupted sequence that stretches from the 5th millennium BC to the Byzantine period (Frangipane 2019). The first round of activities conducted by the Italian expedition at the mound focused on the 2nd and 1st millennium BC (Pecorella 1975). Following a long interruption, excavations on the Late Bronze (*c.* 1600-1200 BC) and the Iron Age (*c.* 1200-700 BC) levels restarted at Arslantepe in 2008. Historically, these are the periods of the Hittite influence at the site and the subsequent creation of an independent Neo-Hittite reign respectively (Hawkins 2000: 282-288). The new project unearthed an uninterrupted sequence of monumental structures, covering the entire Iron Age occupation at the site for a period that approximately ranges from the 12th to the 7th century BC (Manuelli 2019: 163-168; Fig. 2).

THE IRON AGE SEQUENCE AT ARSLANTEPE

The beginning of the Iron Age at the site (Arslantepe IIIA) is characterized by the construction of a massive fortification wall that enclosed and protected the citadel of Arslantepe for *c.* two centuries (Manuelli & Mori 2016: 216-222). During this period, the site was the capital of the kingdom of Malizi, a regional polity that extended its domain to the westward valleys (Di Filippo & Mori 2018). At around 1000 BC a violent fire provoked the destruction and collapse of the fortification and an ensuing change in the settlement pattern of this area of the mound. During the Iron Age II (Arslantepe IIIB), despite the reuse of some of the earlier structures, a series of large silos and pits indicates an area now specifically devoted to storage activities (Manuelli 2020: 113-118). The end of Arslantepe IIIB is dated to the second half of the 9th century BC and marks the beginning of a new important phase for the history of the site. Arslantepe is now known from Assyrian sources to be the capital of the Neo-Hittite reign of Melid (Bryce 2012: 98-101). The Middle Iron Age levels (Arslantepe IIA) are indeed marked by the construction of a succession of three monumental pillared halls that span approximately the period between the end of the 9th and the end of the 8th century BC (Liverani 2010). The later levels of the sequence have been found partially disturbed by modern intrusions. However, Arslantepe IIB is still characterized by the presence of further public monumental structures, dated from the late 8th to the 7th century BC and corresponding to the period of the Neo-Assyrian influence at the site. The end of the sequence is marked by the final conquest and definitive destruction of Arslantepe by Sargon II of Assyria in 712 BC (Liverani 2004).



FIG. 1. — Map of Anatolia and the Levant with the main sites mentioned in the text (modified data courtesy of National Centers for Environmental Information – ETOPO1, Natural Earth and Geo Network opensource. <https://doi.org/10.7289/V5C8276M>).

As a consequence of the abovementioned long-lasting investigations, the Iron Age archeozoological remains have been over the years analyzed by different researchers. In the 1970s-1990s S. Bökönyi (1983) studied a large number of animal bones related to the Late Bronze and Iron Age levels, and since 2007 faunal material has been analyzed by Siracusano & Bartosiewicz (2012). The Arslantepe rooster was found during the 2015 excavation campaign. The bones have been collected from a filling layer – square G3 (15), layer 8b α – corresponding to the final Arslantepe IIIB level, which is dated through associated material and high precision C14 dating to the end of the 9th century BC (Manuelli *et al.* 2021; Fig. 3). This filling layer is associated with the ultimate destruction of the Iron Age fortification wall which sealed the abovementioned silos and pits level. Despite the fact that the bones have not been found *in situ* and unfortunately not much can be said about their exact context, it seems also reasonable to assume that the remains were somehow originally associated to the phase of use of this storing area or to its final employment as a dump. Another fragment that could be attributed to a *Gallus* comes instead from the filling of the last pillared hall of Arslantepe IIA – square G3 (13-14), A1142 layer 1a – dated to the 8th century BC.

In general, animal husbandry at Arslantepe was based on sheep and goat since the earliest time. These comprised slightly more than the half of the total quantity of



FIG. 2. — Arslantepe, the Iron Age monumental sequence. Photo credits: R. Ceccacci, ©MAIAO.

domestic animals, while cattle were around one-third of the animal stock. As far as pig breeding is concerned, they were almost absent during the Early Bronze Age at the site (*c.* 3200-2000 BC) (Siracusano & Bartosiewicz 2012: 108; Siracusano, in press). Pig consumption began instead during the Middle Bronze Age (*c.* 2000-1600 BC), with pigs later reaching 7-8% of the livestock in the Late Bronze Age (Bartosiewicz *et al.* 2013: 277, tab. VI.1). During the Iron Age, a general increase in the presence of the caprine flocks is notable, while pigs gradually lose importance halving their presence among domestic animals. In this period horses and donkeys were also represented, even if always at a low frequency. Hunting has never shown a strong impact on the faunal remains of Arslantepe. Small game and avian finds are in general very sporadic and fowling could hardly have been ordinarily practiced at the site. Interestingly, avifauna increases during the Iron Age, as is shown by the occasional presence of quails, partridges, geese, ducks, as well as herons and cranes, possibly testifying to a more significant involvement of hunting and fowling practices at the site.

THE FIND AND ITS OSTEOLOGICAL PLACEMENT WITHIN COMPARATIVE MATERIAL

The faunal osteological remains at Arslantepe have always been hand-collected and analyzed directly on site. The samples, collected with the best care possible, were ordered in appropriate bags each labelled with scrupulous attention to both horizontal and vertical localizations. The bones themselves were washed and then labelled in order to register each identified sample more accurately in the relative depositional context and to produce more reliable results.

Among the numerous bone fragments of domestic animals collected from the excavations of the Iron Age levels, 15 portions of a galliform skeleton were identified. The bones consist of one scapula, one sternum, two humeri, one radius, two ulna, two tibias, one pelvis, two femurs, two tarsometatarsi and one sacrum (Fig. 4). Except for the sternum,

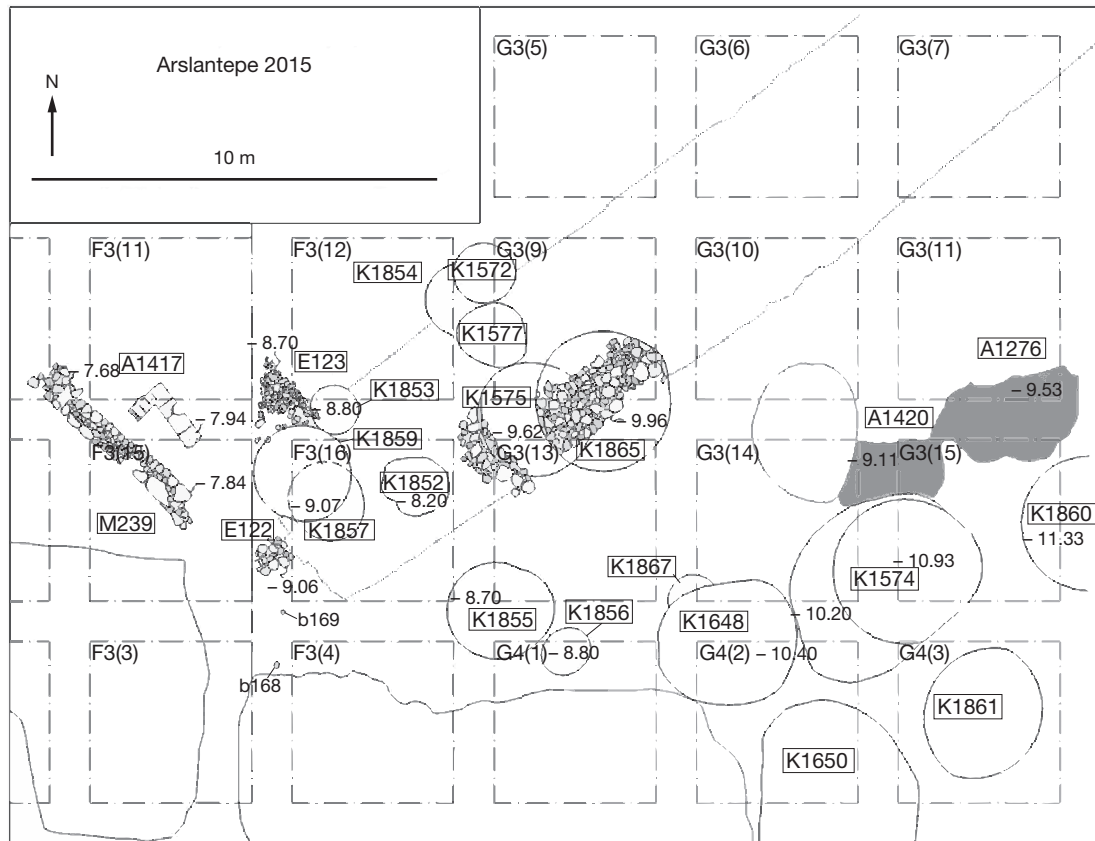


Fig. 3. — Arslantepe, level III B. Credits: G. Liberotti, © MAIAO.

which appeared in three small fragments, the other bones are fairly intact. They are mostly portions of legs and wings and they do not present particular fragmentations, such as those due to food preparation. Even if it is very plausible that the bones belonged to a single specimen, there is still some uncertainty. Indeed, the two tarsometatarsi surely belonged to a single male specimen, while it cannot be excluded that the other remains could also stem from other individuals. Considering this and after comparisons, medullary bone analysis was not taken into consideration. However, we do not exclude the possibility that further future analyses might shed new light on the result here presented.

When possible, bones measurements were taken following von den Driesch (1976: 103-129). Only one of the two tarsometatarsi was measured, at least concerning its maximum length (GL). As said, the morphology of the two tarsometatarsi allowed us to state, with a certain margin of confidence, that they belong to the same individual and that this was an adult male. The spurs are in fact rather developed, reaching over one-third of the length of the tarsometatarsus (Table 1).

Looking for comparisons, we should first of all consider that when dealing with osseous material it is sometimes hard to distinguish well-contextualized and stratified finds from intrusive remains. This is especially clear when considering that most of the examples come from multi-phases settlements excavated more than 40 years ago. In any case, from an osteometrical point of view, the Arslantepe rooster is smaller than

the average of the examples found in the Euphrates region, as at Lidar Höyük and Korucutepe (Boessneck & von den Driesch 1975: tab. 29; Kussinger 1988: 183; Table 2). It should be also noted that the chickens of Lidar Höyük were in part larger than those of Korucutepe. Broadening our horizons, they were also bigger than examples found for instance in northern Iran, at Takht-i Suleiman (Steber 1986: tab. 48) and Bastam (Krauss 1975: tab. 34). In any case, bones of this size fall in the lower range of the Hellenistic domestic chicken of Maresha (Perry-Gal *et al.* 2015: tab. S1) and those from the Byzantine period at Sagalassos (De Cupere *et al.* 2005). Furthermore, they are all in the medium range of the values summarized by Thesing (1977: tab. 6-9) for remains of domestic chickens from the Roman period and the Middle Ages.

The size of the tarsometatarsal spurs of the specimen from Arslantepe precludes their attribution to any local wild Phasianidae reported among the birds used as food resources (Katabiar 2019). This is also confirmed by the lack of any further visible morphological and macroscopical evidence for the distinction of this species and association with the taxonomic family (Tomek & Bochenski 2009; Masaki *et al.* 2016). The chukar, *Alectoris chukar* (J.E. Gray, 1830), the grey partridge, *Perdix perdix* (Linnaeus, 1758), the black francolin, *Francolinus francolinus* (Linnaeus, 1766), and even the see-see partridge, *Ammoperdix griseogularis* (Brandt, 1843), indeed show much smaller dimensions (Johnsgard 1988). Only the size of the pheasant could more closely resemble one of the bones from Arslantepe. But it seems that the common pheasant,



FIG. 4. — Arslantepe, tarsometatarsi (left and right) of rooster from level III B. Photo credits: R. Ceccacci, ©MAIAO. Scale bar: 3 cm.

Phasianus colchicus Linnaeus, 1758, did not belong to the primeval ornithofauna of the region. Indeed, in its expansion to the West the natural spread of this species was still limited to north-eastern Anatolia (Hill & Robertson 1988). In their westernmost distribution, pheasants of the *colchicus* taxonomic group were in fact originally confined to the Transcaucasian region between the north Caucasus and the Caspian Sea coasts (Arrigoni degli Oddi 1929; Ghigi 1968). The first reports of *P. colchicus* in the western oecumene come from a few archaeological sites in Bulgaria and are dated not prior to the Chalcolithic Age (c. 5530-5480 BC) (Boev 1997; Masseti 2002).

The very pronounced tarsometatarsal spurs of the Arslantepe collection recall those of capons. Despite the fact that capon bones have always been the subject of discussions among scholars (Peters 1997: 54) and that their presence in the Iron Age seems also rather unlikely, the practice of castration cannot be ruled out *a priori*. In this framework, it should be noted that the spurs begin to appear as protuberances on the legs of roosters towards the 5th month (Habermehl 1975: 181). Our individual shows how well-developed the spurs were, indicating that the specimen was certainly an adult. With regard to the tarsometatarsus, it has been noted that the Arslantepe rooster had rather short legs compared to the size of those from Korucutepe (Table 2). However, the specimen does not show cut marks or other traces on its bones that could indicate the consumption of its meat by human beings. This is further proved by the fact that its osteological fragments have all been found in reciprocal connection and undamaged. So the main question is: was it perhaps an animal kept in captivity for breeding purposes? Or considering its rarity and exoticism, could it be a specimen destined for exhibition? Indeed, collecting allochthonous ani-

TABLE 1. — Measurements of the Arslantepe rooster according to von den Driesch (1976: 103-129). Measurements are all in mm. Abbreviations: **Bd**, breadth of the distal end; **BFd**, breadth of distal facet; **BG**, breadth glenoid; **Bp**, proximal breadth; **BT**, breadth distal troclea; **DAPp**, proximal antero-posterior diameter; **Dd**, depth of the distal end; **Dic**, diagonal cranial; **Dp**, proximal depth; **GL**, greatest length; **SC**, smallest breadth of the corpus; **SD**, smallest breadth of diaphysis; *, approximate measurement.

Arslantepe context		<i>Gallus gallus</i> L. Measurements						
G3(15) 8b α	scapula	GL	Dic	BG				
		64.8	5.8	11.2				
G3(15) 8b α	humerus	GL	Bp	Dp	SC	Bd	BT	
		64.2	18.3	11.1	5.8	16	15.1	
		GL	Bp	DAPp	SD	Bd	BFd	
G3(15) 8b α	radius	57.1	6.1	5.9	—	6.8	4	
G3(15) 8b α	ulna	GL	Bp	Dp	SC	Dd	Bd	
		65.3	9.7	8.5	5.4	10	7.3	
		GL	Bp	Dp	SC	Dd	Bd	
G3(15) 8b α	tibiotarsus	—	17	12.6	4.9	—	—	
G3(15) 8b α	femur	70*	—	—	—	14	11.2	
G3(15) 8b α	tarsometatarsus	63.2	13.6	11.1	—	15	9.9	
G3(15) 8b α	spur	22.6	—	—	—	—	—	

TABLE 2. — Bones measurements of the roosters from Arslantepe, Lidar Höyük and Korucutepe according to von den Driesch (1976: 103-129). Measurements are all in mm. Abbreviations: **Bd**, breadth of the distal end; **Bp**, proximal breadth; **GL**, greatest length; **SC**, smallest breadth of the corpus; **SD**, smallest breadth of diaphysis; *, approximate measurement.

<i>Gallus</i> sp.	Measure	Arslantepe	Lidar Höyük	Korucutepe	
scapula	GL	64.8	67	—	
	humerus	GL	64.2	76-65	60.2
	Bp	18.3	20.5-17.2	—	
	SC	5.8	7.5-6	5.3	
	Bd	15.7	16.2-13	12.2	
radius	GL	57.1	66.5-59.5	—	
	ulna	GL	65.3	70-66	—
femur	GL	70*	92-72	64.0-52	
	tibiotarsus	SD	4.9	6.2-5	—
tarsometatarsus	Bd	6.8	12-9.8	—	
	GL	63.2	91-71	84.5	
	Bp	13.6	15.5-11.5	15	
	Bd	14.7	15.5-12	14.2	

mals of various kinds was a common practice among ancient rulers. Indeed, the exotic zoological species kept in the royal menageries represented authentic status symbols that underscored the affluence and social position of their owners, while the possession and display of rare animals was considered a sign of prestige and power.

THE DISPERSAL HISTORY OF CHICKEN IN THE WIDER REGION

The red junglefowl, *Gallus gallus* (Linnaeus, 1758), is not indigenous to Turkey. It is regarded as the main progenitor of all current domestic chickens, which are scientifically classified as logically belonging to the same species (Wong 2004). In fact, it makes no sense to give the significance of subspecies, or even of different species, to the domestic forms derived from the same unique wild ancestor.

Spreading from the Indian subcontinent to Indochina and the Indonesian archipelago, *G. gallus* populates both the monsoon jungles and the equatorial forests, as well as the green areas of the anthropogenic environments (BirdLife International 2016). The chromatic and morphological variations that this species presents in different geographical areas are very marked, particularly in males. Since 1992, these birds are all commonly called *bankiva*, although properly speaking this term only refers the junglefowl of Java. *Bantam* is another epithet to indicate numerous dwarf breeds, derived from an ethnic human group native to the namesake locality of Java. Some studies have placed the beginning of its domestication in the Neolithic of northern China, but contrary to what Xiang *et al.* (2014) claimed, it is not yet clear when the first domestic chickens actually appeared there (Eda *et al.* 2016). The research, however, suggests that wild junglefowl – mainly due to the absence of adequate environmental parameters – were a rare presence in central and northern China, assuming a likely human-mediated import of animals from south-eastern Asia (Peters *et al.* 2016). Domestic breeds of junglefowl occurred in India as early as 3200 BC (Watson 2002). A few artefacts possibly representing chickens are known from the Mohenjo Daro civilization in the Indus Valley (Pakistan). They include, among others, a clay figurine dated to *c.* 2700 BC (Brooklyn Museum, New York), and two seals (2500-2100 BC). It seems probable that chickens entered the Near East spreading slowly across Iran (3900 BC) into Turkey (2900-2400 BC), Syria (2400-2000 BC), and Jordan (1200 BC) (Table 3). Based upon textual evidence, the red junglefowl was known in Mesopotamia by the time of the Third Dynasty of Ur (2113-2006 BC) (Heimpel & Calmeyer 1972: 487, 488; Salonen 1973: 154).

It might be speculated that the spread of domestic chickens occurred via nomadic populations: this would account for instance for their appearance in Iran and Turkey at early dates. Despite the fact that the involvement of nomadic people in the spread of this species is hardly demonstrable in this period, a similar diffusion can be clearly traced when dealing with the translocations of junglefowl over ocean distances, such as the examples brought to Marianas Islands from the Philippines can show (Oustalet 1895; Crawford 1993; Heaney *et al.* 1997; Masetti & Van der Mije 2014).

In Iran, evidence of the chicken is reported from Tepe Yahya with one fragment in deposits dated to 3900-3800 BC and a larger sample from deposits dated to 1000 BC (Meadow 1986). In Turkey, chicken bones have been reported in the faunal samples from Hayaz Höyük (2900-2400 BC) (Buitenhuis 1985). Other finds are reported as said at Lidar Höyük (Kussinger 1988: 183-185), while evidence dating back to the Bronze Age comes from Yarikkaya, in Central Anatolia (2600-2300 and 1500-1200 BC) and Korucutepe (1800-1600 BC) (Boessneck & von den Driesch 1975: 120; Boessneck & Wiedemann 1977). The introduction of the species into Anatolia from the East is also documented between the end of the 2nd and the beginning of the 1st millennium BC. *Gallus* bones are also reported from Boztepe in the Upper Tigris,

where a chicken was identified in the Iron Age levels (Parker *et al.* 2002: 56-58). Despite the fact that relative findings became more frequent from this period onwards, at Kinet Höyük domestic fowl, chicken in particular, do not appear until the later phases of the Iron Age (Kabatlar 2017). Faunal remains from Ziyaret Tepe (ancient Tishkan), a Neo-Assyrian site in southeastern Turkey, include three chicken elements (Matney *et al.* 2011; Greenfield *et al.* 2013).

From Anatolia and Mesopotamia, the species would have been imported into Syria and the Levant. In Syria, osteological remains of the species are reported in faunal assemblages at Tell Sweihat (2400-2000 BC) (Buitenhuis 1983) and at Tell Hadidi (2000-1400 BC) (Buitenhuis 1979). Three chicken bones are reported from Tell Mishrifeh (ancient Qatna), one each from the Middle Bronze Age, Late Bronze Age, and Iron Age (Vila & Gourichon 2007). As far as is presently known, the earliest chicken in Israel is a single bone from the Middle Bronze Age III (1650-1550 BC) levels at Shiloh (Hellwing *et al.* 1993). However, it should be considered that the massive spread of chicken into the Near Eastern region does not occur before the Persian time in the 6th-5th century BC (Lindner 1979).

CHICKENS CONQUERING THE WEST

The discovery of the *Gallus gallus* remains at Arslantepe, in an archaeological context dated to the very beginning of the 1st millennium BC, seems in a way to anticipate the introduction of the bird in the western ocumene.

Domestic junglefowl spread rapidly into the Mediterranean world, where we find them already documented in the island of Crete from around the middle of the 2nd millennium BC (Watson 2002). From the 9th century BC, chicken bones have been discovered in Eleftherna on Crete (Vila 1994; Nobis 1998, 1999, 2003) and Kition on Cyprus (A. Gardeisen, pers. com.).

According to Watson (2002), these birds were already present as cage animals in ancient Greece. Although they were unknown to Homer and Hesiod (Pollard 1977), chickens appear on Greek coins of the town of Himera in Sicily before 842 BC (Thompson D'Arcy 1895), and in Ephesus in 700 BC (Watson 2002). There, and on the Greek mainland, they may have been introduced from Persia and probably entered Italy through Greek colonies shortly thereafter (Wood-Gush 1985). Not by chance, in fact, the rooster was described by Aristophanes (*Aves*, 483) as a “Persian” bird. The oldest securely identified remains of the species so far available in Italy would be contemporary to its first appearance in the Greek coin iconography. In fact, chickens were imported in the course of the Iron Age (De Grossi Mazzorin 2005; George *et al.* 2017). As far as is presently known, the first bones were uncovered by the excavation of the site of Monte Cucco (Castel Gandolfo, Rome), in central Italy, and dated to the end of the 9th or beginning of the 8th century BC (Bartoloni *et al.* 1987; De Grossi Mazzorin 2005; Corbino *et al.* 2018, in press). While the osteological evidence of

domestic junglefowl becomes more common after this date, they remain rare outside of ritual and funerary contexts in central Italy until the Hellenistic period. In northern Italy, the move to the quotidian consumption of chicken may have occurred slightly earlier than in Etruria (George *et al.* 2017).

In Etruscan culture, chickens still seem to be regarded more as exotic rarities, representing authentic status symbols that underscored the affluence and social positions of their owners. They were not yet used for food purposes as they were later in Roman times. This can be seen, for example, in a floor mosaic with ducks and sea life, in which a wildcat – possibly of the Asian subspecies *Felis silvestris ornata* Gray, 1832 (Masseti, in press) – is catching a hen, from the House of the Faun at Pompeii during the 1st century AD (Museo Archeologico Nazionale, Napoli); or in an *opus vermiculatum* fragment with the same subject, from the late Republican era, dated to the first quarter of the 1st century BC (National Roman Museum – Palazzo Massimo, Rome). The hens portrayed in both of these mosaics show the unmistakable phenotypic characters of the Middle and Far Eastern junglefowl or one of its oldest domestic breeds, such as the *bankiva* (Ghigi 1968; see also Giavarini 1983). There are even several famous mosaics depicting rooster fights, like the one from Pompeii, referred to the 1st century BC (Museo Archeologico Nazionale, Napoli). According to Toynbee (1973), in Italy fighting junglefowls were kept for sport as early as the 2nd century BC, as indicated in Lucilius' words on the victor rooster that struts proudly along, rising on tiptoe as it goes (Marx 1904: 22, 300, 301). The appearance of *G. gallus* in Etruscan decorative contexts seems to be more motivated by aesthetic and ornamental needs than the real appreciation of its domestication, not unlike other wild birds that were kept in captivity in the patrician houses for recreational purposes.

On the other side of the Mediterranean, the oldest bones of these birds have been documented in the Iberian Peninsula from the first half of the 8th century BC in sites with clear connections to the Phoenician world, such as Castillo de Doña Blanca in Cadiz (Hernández Carrasquilla & Jonsson 1994), and they were also found at Toscanos y Cerro de la Tortuga, in Malaga and dated to the 7th century BC (Hernández Carrasquilla 1992; Albizuri Canadel *et al.* 2020).

CONCLUSIONS

So, why did chickens have this success? A first observation regards the ease of their breeding. They do not require special work to contain them, do not travel long distances or run and are not able to make long flights. They were allowed to roam freely between the houses of the villages. They do not require much effort, even children could take care of them.

What was the role of the chicken in the subsistence system? They were a locally maintained inexpensive protein resource. Chicken meat production is two to three times more efficient than meat production from pigs, which is in turn two to three times more efficient than cattle and domestic caprine (Redding 2015). It essentially does not need to be fed except

TABLE 3. — Occurrence and spread of domestic junglefowl *Gallus gallus* (Linnaeus, 1758) from the Near East to the Western world.

Date (BC)	Site	Reference
3900-3800	Tepe Yaha (Iran)	Meadow 1986
2900-2400	Hayaz Höyük (Turkey)	Buitenhuis 1985
2600-2300	Yarikkaya (Turkey)	Boessneck & Wiedemann 1977
Early Bronze Age	Lidar Höyük (Turkey)	Kussinger 1988
2400-2200	Tell Sweyhat (Syria)	Buitenhuis 1983
Late 3 rd millennium	Tall al'Umayri (Jordan)	Peters <i>et al.</i> 2002
2000-1400	Tell Hadidi (Syria)	Buitenhuis 1979
Middle Bronze III (1650-1550)	Shiloh (Israel)	Hellwing <i>et al.</i> 1993
1800-1600	Korucutepe (Turkey)	Boessneck & von den Driesch 1975
Hittite Empire 1200-900	Kaman-Kalehöyük (Turkey) Hesban (Jordan)	Hongo 1993 LaBianca <i>et al.</i> 1990
1000-850	Arslantepe (Turkey)	Present study
Iron Age (1 st millennium)	Boztepe (Turkey)	Parker <i>et al.</i> 2002
900-600	Tall Seh Hamad (Syria)	Becker 2008
9 th -8 th century	Boğazköy-Büyükkaya (Turkey)	von den Driesch & Pöllath 2004
End of the 9 th -8 th century	Monte Cucco (Italy)	Corbino <i>et al.</i> 2018
Late Assyrian (862-611)	Ziyaret Tepe (Turkey)	Greenfield <i>et al.</i> 2013
Late Phrygian (550-330)	Gordion (Turkey)	Zeder & Arter 1994

with the waste of agricultural production and the remains of food. They also require a small amount of water, less than the other domestic animals. Domestic fowls practically provide continuous nourishment, considering their short reproductive intervals and prolific nature and, above all, the fact that they produce eggs almost seamlessly for most of the year. Indeed, quoting one of the most popular sayings of the Vaudeville theater (Adam 1977: 9): “chicken is the only animal that can be eaten before it is born and after it dies”.

To conclude, why is the discovery of the chicken remains from the Iron Age levels at Arslantepe relevant to this issue? Its appearance at the very beginning of the 1st millennium BC conforms well with the dispersal history of chicken known up to now, considering the arrival of the species in south-eastern Anatolia at around the mid-2nd millennium BC and its subsequent spread at the turn of the new millennium. The osteological analysis of the specimen from Arslantepe shows us that the adult animal was probably kept in captivity. It was found with fairly intact bone portions all gathered together, maybe as a sign of the fact that it was kept in a cage and was certainly used for purposes other than those specifically related to direct food consumption (Becker 2008; Grigson *et al.* 2015). Actually, despite the evidently wide spread of the species from east to west during the 2nd and early 1st millennium BC, it is not possible to ignore the fact that chicken remains have always been very limited in their quantity and that, as said, domestic junglefowl became popular in the context of daily diet only later, during the Hellenistic and the Roman periods.

With this in mind, it is possible to assume that the chicken still played a sort of symbolic role as exotic rarity at the beginning of the 1st millennium BC. The remains of exotic animals, such as elephants, lions, leopards and even cheetahs are attested, although sporadically, at Arslantepe over the centuries (Bökönyi 1985, 1993; Siracusano 2012). They certainly testify to practices of self-glorification attested at the site, stressing once again that some species were not necessarily considered as food resources only (Bartosiewicz 2010: 125, 126; Siracusano & Bartosiewicz 2012: 114). In the specific context of the beginning of the 1st millennium BC, it should be noted that also some fragments of Asiatic elephants (*Elephas maximus* Linnaeus, 1758) have been found (Bökönyi 1985). Moreover, the presence at the site of exotic objects and artworks should also be considered, such as some finely made ivory, distinctive imported or locally imitated bone and bronze material. These further testify to the participation of high-ranking individuals in a wider scenario of interculturality, exchange and globalism (Manuelli & Pittman 2018). In conclusion, the discovery of the rooster at Arslantepe, in the context of the flourishing Iron Age societies, can be seen as a practice of wealth display probably associated with the emerging new high-status ruling class at the site.

Acknowledgments

The authors are grateful to the director of the excavations at Arslantepe, Marcella Frangipane (Rome), for her support and for having allowed the study of the material presented here. Research carried out at Arslantepe has been made possible by the financial support of the Sapienza University of Rome and the Italian Ministry of Foreign Affairs. We are thankful to the anonymous reviewers for their excellent advice and suggestions for improvement. Appreciation is also due to Nathalie Kallas (Berlin) for her help with the map and the French translations and to Armelle Gardeisen (Université Paul-Valéry Montpellier 3) for the valuable feedback on the first appearance of chickens in the western world. F. Manuelli wrote sections 1, G. Siracusano section 3, M. Masseti sections 4 and 5; section 2 has been jointly written by F. Manuelli & G. Siracusano, while the three authors contributed together to write the conclusions. Unless specified, images from Arslantepe belong to the archive of the project (Missione Archeologica Italiana in Anatolia Orientale – ©MAIAO).

REFERENCES

ADAM J. F. 1977. — *Backyard Poultry Raising: The Chicken-Growing, Egg-Laying, Feather-Plucking, Incubating, Caponizing, Finger-Licking Handbook*. Doubleday, Garden City, 136 p.

ALBIZURI CANADEL S., LÓPES CACHERO J., MARLASCA R., TERRATS JIMENEZ N., GARCÍA A., MAJÓ T., CARLÚS X., OLIVA POVEDA M., RODRÍGUEZ A. & PALOMO A. 2020. — Los restos de gallo (*Gallus gallus*) come bioindicador de presencia foránea. El Paraje de Can Roqueta en el noreste de la Península Ibérica y su relación con el comercio fenicio, in CELESTINO PÉREZ S. & RODRÍGUEZ GONZÁLES E. (eds), *Un vaje entre el Oriente y el Occidente del Mediterráneo. IX Congreso Internacional de Estudios Fenicios y*

Punicos, Mérida 2018. Instituto de Arqueología, Mérida: 675-688.

ARISTOPHANES: see COULON *et al.* 2009.

ARRIGONI DEGLI ODDI E. 1929. — *Ornitologia italiana*. Hoepli, Milano, 1046 p.

BARTOLONI G., BURANELLI D., D'ATRI V. & DE SANTIS A. 1987. — *Le urne a capanna rinvenute in Italia*. Giorgio Bretschneider, Roma, 289 p.

BARTOSIEWICZ L. 2010. — Herding in Period VI A. Development and changes from Period VII, in FRANGIPANE M. (ed.), *Economic Centralisation in Formative States. The Archaeological Reconstruction of the Economic System in 4th Millennium Arslantepe*. Sapienza Università di Roma (coll. Studi di Preistoria Orientale; 3), Rome: 119-148.

BARTOSIEWICZ L., BÖKÖNYI S. & SIRACUSANO G. 2013. — Animal husbandry, in MANUELLI F. (ed.), *Arslantepe Vol. IX – Arslantepe Late Bronze Age: Hittite Influence and Local Traditions in an Eastern Anatolian Community*. Sapienza Università di Roma, Rome: 275-284.

BECKER C. 2008. — Die Tierknochenfunde aus Tall Seh Hamad/Dur-Katlimmu: eine zoogeographisch-haustierkundliche Studie, in KÜHNE H. (ed.), *Umwelt und Subsistenz der Assyrischen Stadt Dur-Katlimmu am Unteren Habur*. Harrassowitz, Wiesbaden: 61-131.

BIRDLIFE INTERNATIONAL 2016. — Red Junglefowl: *Gallus gallus*. *The IUCN Red List of Threatened Species 2016*: e.T22679199A92806965. <https://doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22679199A92806965>

BOESSNECK J. & DRIESCH A. VON DEN 1975. — Tierknochenfunde vom Korucutepe bei Elazig in Ostanatolien, in VAN LOON M. N. (ed.), *Korucutepe: Final Report on the Excavations of the Universities of Chicago, California (Los Angeles) and Amsterdam in the Keban Reservoir, Eastern Anatolia, 1968-1970*. Vol. 1. Elsevier, Amsterdam, New York: 1-191.

BOESSNECK J. & WIEDEMANN V. 1977. — Tierknochen aus Yarıkkaya bei Boğazköy. *Anatolien Archäologie und Naturwissenschaften* 1: 106-128.

BOEV S. 1997. — Wild galliform and gruiform birds (Aves, Galliformes and Gruiformes) in the archaeological record from Bulgaria. *International Journal of Osteoarchaeology* 7 (4): 430-439. [https://doi.org/10.1002/\(SICI\)1099-1212\(199707/08\)7:4<430::AID-OA356>3.0.CO;2-5](https://doi.org/10.1002/(SICI)1099-1212(199707/08)7:4<430::AID-OA356>3.0.CO;2-5)

BÖKÖNYI S. 1983. — Late Chalcolithic and Early Bronze Age I. Animal remains from Arslantepe (Malatya) Turkey: preliminary report, in FRANGIPANE M. & PALMIERI A. (eds), *Perspectives on Protourbanization in Eastern Anatolia: Arslantepe (Malatya). An Interim Report on 1975-1983 Campaigns*. Gangemi, Rome: 584-598.

BÖKÖNYI S. 1985. — Subfossil elephant remains from Southwestern Asia, in PERROT J. (ed.), *Actes du séminaire CNRS/NSF de Bellevaux (24-29 juin 1985): L'évolution des sociétés complexes du sud-ouest de l'Iran. Paléorient* 11 (2): 161-163.

BÖKÖNYI S. 1993. — Hunting in Arslantepe, Anatolia, in FRANGIPANE M., HAUPTMANN H., LIVERANI M., MATTHIAE P. & MELLINK M. (eds), *Between the Rivers and Over the Mountains. Archaeologica Anatolica et Mesopotamica, Alba Palmieri Dedicata*. Sapienza Università di Roma, Rome: 341-360.

BROWN M. & WILKINSON T. J. 2017. — The Euphrates States and Elbistan: archaeology, in WEEDEN M. & ULLMANN L. Z. (eds), *Hittite Landscape and Geography*. Brill, Leiden, Boston: 146-158.

BRYCE T. R. 2012. — *The World of the Neo-Hittite Kingdoms: A Political and Military History*. Oxford University Press, Oxford, New York, 356 p. <https://doi.org/10.1093/acprof:oso/9780199218721.001.0001>

BUITENHUIS H. 1979. — The faunal remains from Tell Hadidi, in KUBASIEWICZ M. (ed.), *Archaeozoology*. Vol. 1: *Proceedings of the IIIrd International Archaeozoological Conference Held 23-26th April 1978, at the Agricultural Academy Szczecin, Poland*. Agricultural Academy, Szczecin: 164-175.

BUITENHUIS H. 1983. — The animal remains from Tell Sweyhat, Syria. *Palaeohistoria* 25: 131-144.

- BUITENHUIS H. 1985. — Preliminary report on the faunal remains of Hayaz Hüyük from the 1974-1983 seasons. *Anatolica* 12: 61-74.
- CORBINO C. A., MINNITI C., DE GROSSI MAZZORIN J. & ALBARELLA U. 2018. — Earliest evidence of chicken in Italy, in ALBARELLA U., BAKER P., BROWAEYS E., CORBINO C. A., MULVILLE J., POLAND G. & WORLEY F. (eds), *Book of Abstract of the 9th Bird Working Group Meeting: The Archaeology of Human-Bird Interactions, Sheffield, 2018*. FRS-FNRS, Bruxelles; University of Sheffield: 29.
- CORBINO C. A., MINNITI C., DE GROSSI MAZZORIN J. & ALBARELLA U. (in press). — The earliest evidence of chicken in Italy, in *The archaeology of human-bird interactions: essays in honour of Dale Serjeantson*. Vol. 2. *Quaternary International*.
- COULON V., IRIGOIN J. (eds) & VAN DAELE H. (trad.) 2009. — *Aristophane: Comédies*. Tome 3, *Les Oiseaux – Lysistrata*. Les Belles Lettres (coll. des Universités de France Série grecque – coll. Budé; 49), Paris, 324 p.
- CRAWFORD P. 1993. — *Nomads of the Wind. A Natural History of Polynesia*. BBC Books, London, 272 p.
- DE CUPERE B., VAN NEER W., MONCHOT H., RIJMENANTS E., UDRESCU M. & WAELKENS M. 2005. — Ancient breeds of domestic fowl (*Gallus gallus* f. domestica) distinguished on the basis of traditional observations combined with mixture analysis. *Journal of Archaeological Science* 32 (11): 1587-1597. <https://doi.org/10.1016/j.jas.2005.04.015>
- DE GROSSI MAZZORIN J. 2005. — Introduzione e diffusione del pollame in Italia ed evoluzione delle sue forme di allevamento fino al Medioevo, in FIORE I., MALERBA G. & CHILARDI S. (eds), *Atti del 3° Convegno Nazionale di Archeozoologia. Studi di Paleontologia II*. Istituto Poligrafico e Zecca dello Stato, Rome: 351-360.
- DI FILIPPO F. & MORI L. 2018. — How difficult? Mountain roads and pathways reaching ancient Melid (Malatya) in south-Eastern Anatolia: a reconsideration. *Studi Micenei ed Egeo-Anatolici Nuova Serie* 4: 41-62.
- DRIESCH A. VON DEN 1976. — *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Harvard University Press (coll. Peabody Museum Bulletin; 1), Cambridge, 136 p.
- DRIESCH A. VON DEN & PÖLLATH N. 2004. — *Vor- und frühgeschichtliche Nutztierhaltung und Jagd auf Büyükaya in Boğazköy-Hattuša, Zentralanatolien*. Von Zabern, Mainz, 79 p.
- EDA M., LU P., HIROKI K., LI Z., LI F. & YAN J. 2016. — Reevaluation of early Holocene chicken domestication in northern China. *Journal of Archaeological Sciences* 67: 25-31. <https://doi.org/10.1016/j.jas.2016.01.012>
- FRANGIPANE M. 2019. — Arslantepe. the rise and development of a political centre: from temple to palace to a fortified citadel, in DURAK N. & FRANGIPANE M. (eds), *Proceedings of the 1st International Arslantepe Archaeology Symposium, 4-6 October 2018 Malatya*. İnönü Üniversitesi Matbaası, Malatya: 71-104.
- FRANGIPANE M. & LIVERANI M. 2013. — Neo-Hittite Melid: continuity or discontinuity?, in YENER K. A. (ed.), *Across the Border: Late Bronze-Iron Age Relations Between Syria and Anatolia. Proceedings of a Symposium Held at the Research Center of Anatolian Studies, Koç University, Istanbul, May 31-June 1 2010*. Peeters, Leuven, Paris, Walpole: 349-371.
- GEORGE D., BIZZARRI C., BIANCO P., TRENTACOSTE A., WHITLAM J. & BEST J. 2017. — Recent research in Cavità 254 (Orvieto, Italy). *Etruscan Studies* 20 (1): 58-76. <https://doi.org/10.1515/etst-2017-0002>
- GHIGI A. 1968. — *Fagiani, pernici ed altri galliformi del mondo*. Edagricole, Bologna, 456 p.
- GIAVARINI I. 1983. — *Le razze dei polli*. Edagricole, Bologna, 139 p.
- GREENFIELD T., WICKE D. & MATNEY T. 2013. — Integration and interpretation of architectural and faunal evidence from Assyrian Tushan, Turkey. *Bioarchaeology of the Near East* 7: 47-75.
- GRIGSON C., EDWARDS Y. & CERÓN-CARRASCO R. 2015. — The fauna of Tell Nebi Mend (Syria) in the Bronze and Iron Age – a diachronic overview. Part 2, Hunting, fowling and fishing. *Levant* 47: 164-185. <https://doi.org/10.1179/0075891415Z.000000000064>
- HABERMEHL K.-H. 1975. — *Die Altersbestimmung bei Haus- und Laboratorien*. Paul Parey, Berlin, 216 p.
- HAWKINS J. D. 2000. — *Corpus of Hieroglyphic Luwian Inscriptions*. De Gruyter, Berlin, 639 p.
- HEANEY L. R., BALETE D. S. & DANS A. T. 1997. — Terrestrial mammals, in WILDLIFE CONSERVATION SOCIETY OF THE PHILIPPINES (ed.), *Philippine Red Data book*. Makati City, Philippines: 139-168.
- HEIMPEL W. & CALMEYER P. 1972. — Huhn, in EDZARD D. O. (ed.), *Reallexikon der Assyriologie und Vorderasiatischen Archäologie*. Vol. 4. De Gruyter, Berlin: 175.
- HELLWING S., SADE M. & KISHON V. 1993. — Faunal remains, in FINKELSTEIN I. (ed.), *Shiloh: The Archaeology of a Biblical Site*. Institute of Archaeology, Tel Aviv University: 309-350.
- HERNÁNDEZ CARRASQUILLA F. 1992. — Some comments on the introduction of domestic fowl in Iberia. *Archaeofauna* 1: 45-53.
- HERNÁNDEZ CARRASQUILLA F. & JONSSON L. 1994. — Las Aves, in ROSSELLÓ E. & MORALES A. (eds), *Castillo de Doña Blanca. Archaeo-environmental investigations in the Bay of Cádiz Spain (750-500 BC)*. *British Archaeological Report, International Series* 593: 81-90.
- HILL D. & ROBERTSON P. 1988. — *The Pheasant. Ecology, Management and Conservation*. BSP Professional Books, Oxford, London, Edinburgh, 294 p.
- HONGO H. 1993. — Faunal remains from Kaman-Kalehöyük, Turkey: a preliminary analysis, in BUITENHUIS H. & CLASON A. T. (eds), *Archaeozoology of the Near East. Proceedings of the First International Symposium on the Archaeozoology of Southwestern Asia and Adjacent Areas*. Universal Book Services, Leiden: 67-77.
- JOHNSGARD P. A. 1988. — *The Quails, Partridges, and Francolins of the World*. Oxford University Press, Oxford, New York, Tokyo, 352 p.
- KABATCIAR R. 2017. — *Life on the Periphery. Life at the Crossroads: A Zooarchaeological Perspective on Late Bronze and Early Iron Age Animal Utilization at Kinet Höyük (Turkey)*. PhD Dissertation, University of Toronto, 375 p.
- KATABIAR R. 2019. — Dark Age dwellers in light: subsistence strategies at Kinet Höyük (Turkey) in the Early Iron Age, in WELTON L. & CHARAF H. (eds), *The Iron Age I in the Levant: a view from the North (Part 1)*. *Archaeology & History in the Lebanon* 50-51: 48-69.
- KRAUSS R. 1975. — *Tierknochenfunde aus Bastam in Nordwest-Azerbaidjan/Iran (Fundmaterial der Grabungen 1970 und 1972)*. PhD Dissertation, Ludwig-Maximilians-Universität München, 207 p.
- KUSSINGER S. 1988. — *Tierknochenfunde vom Lidar Höyük in Südostanatolien (Grabungen 1979-1986)*. PhD Dissertation, Ludwig-Maximilians-Universität München, 229 p.
- LABIANCA Ø. S., HAYNES L. A., HUBBARD L. E. & RUNNING L. G. 1990. — *Sedentarization and Nomadization: Food System Cycles at Hesban and Vicinity in Transjordan*. Andrews University Press, Ann Arbor, 353 p.
- LINDNER H. 1979. — *Zur Frühgeschichte des Haushuhns im Vorderen Orient*. M.A. Dissertation, Ludwig-Maximilians-Universität München, 66 p.
- LIVERANI M. 2004. — Gli Ittiti sulle rive dell'Eufrate, in FRANGIPANE M. (ed.), *Alle origini del potere. Arslantepe, la collina dei leoni*. Electra, Milan: 160-165.
- LIVERANI M. 2010. — Il salone a pilastri della Melid neo-hittite. *Scienze dell'Antichità* 16: 649-675.
- LUCILIUS: see MARX 1904.
- MANUELLI F. 2019. — From the margin of the Hittite State to the capital of the kingdom of Medid: the Late Bronze Age and Iron Age developments at Arslantepe, in DURAK N. & FRANGIPANE M. (eds), *Proceedings of the 1st International Arslantepe Archaeology Symposium, 4-6 October 2018 Malatya*. İnönü Üniversitesi Matbaası, Malatya: 157-171.

- MANUELLI F. 2020. — The regeneration of the Late Bronze Age traditions and the formation of the kingdom of Malizi, in SOLLEE A. (ed.), *Formation, Organization and Development of the Iron Age Societies*. Proceedings of the workshop held at the 10th ICAANE in Vienna, April 2016. Österreichischen Akademie der Wissenschaften (coll. Oriental and European Archaeology; 15), Vienna: 109-129.
- MANUELLI F. & MORI L. 2016. — The king at the gate. Monumental fortifications and the rise of local elites at Arslantepe at the end of the 2nd millennium BCE. *Origini* 39: 203-235.
- MANUELLI F. & PITTMAN H. 2018. — A flame and frond ivory plaque from the Neo-Hittite excavations at Arslantepe/Melid. Regionalisms and communities in Iron Age Anatolia. *Origini* 41: 139-169.
- MANUELLI F., VIGNOLA C., MARZAIOLI F., PASSARIELLO I. & TER-RASI F. 2021. — The beginning of the Iron Age at Arslantepe: A ¹⁴C perspective. *Radiocarbon* 63 (3): 885-903. <https://doi.org/10.1017/RDC.2021.19>
- MARX F. (ed.) 1904. — *C. Lucilii Carminum Reliquiae. Volumen prius: Prolegomena, Testimonia, Fasti Luciliani, Carminum Reliquiae, Indices*. Teubner, Leipzig, cxxxvi + 169 p.
- MASAKI E., PENG L., HIROKI K., ZHIPENG L., FAN L. & JING Y. 2016. — Reevaluation of early Holocene chicken domestication in northern China. *Journal of Archaeological Science* 67: 25-31. <https://doi.org/10.1016/j.jas.2016.01.012>
- MASSETI M. 2002. — *Uomini e (non solo) topi. Gli animali domestici e la fauna antropocora*. Firenze University Press, Firenze, 337 p.
- MASSETI M. (in press). — “Qui gatta ci cova”. A short natural history of *Felis silvestris* Schreber, 1777, in Italy. *Atti del Museo di Storia Naturale della Maremma 2020*.
- MASSETI M. & VAN DER MIJE S. 2014. — Squirrels from the Mariana Islands (south-western Pacific) in the Naturalis Biodiversity Center, Leiden, with notes on the mammalian fauna of this Micronesian archipelago. *Archives of Natural History* 41 (2): 270-279. <https://doi.org/10.3366/anh.2014.0247>
- MATNEY T., GREENFIELD T., HARTENBERGER B., JALBRZIKOWSKI C., KÖROĞLU K., MACGINNIS J., MARSH A., MONROE M. W., ROSENZWEIG M., SAUER K. & WICKE D. 2011. — Excavations at Ziyaret Tepe, Diyarbakir province, Turkey, 2009-2010 seasons. *Anatolica* 37: 7-114.
- MEADOW R. H. 1986. — The geographical and palaeoenvironmental setting of Tepe Yahya, in LAMBERG-KARLOWSKY C. C. & BEALE T. W. (eds), *Excavations at Tepe Yahya, Iran: The Early Periods*. Harvard University (coll. American School of Prehistoric Research bulletin; 38), Cambridge: 21-38.
- NOBIS G. 1998. — Studien an Tierresten aus archäologischen Grabungen Poros bei Iraklion und Eléfherna bis Arkadhi: ein Beitrag zur antiken Wild- und Haustierfauna Kretas, in ANREITER P., BARTOSIEWICZ L., JEREM E & WEID W. (eds), *Man and the Animal World. Studies in Archaeozoology, Archaeology, Anthropology and Paleolinguistics in Memoriam Sándor Bökönyi*. Archaeolingua, Budapest: 409-433.
- NOBIS G. 1999. — Archäozoologische Studien an Tierresten aus Eleutherna auf Kreta – Grabungen 1994-1997. *Tier und Museum* 6: 49-67.
- NOBIS G. 2003. — Αρχαιοζωολογική μελέτη στην Ελεύθερνα της Κρήτης (ανασκαφές 1994-7): συμβολή στον προβληματισμό για την εξάπλωση των άγριων θηλαστικών σε αυτή τη ζωογεωγραφική περιοχή [An archaeozoological study in Eleftheria, Crete (reviews 1994-7): contribution to the debate on the distribution of wild mammals in this zoogeographical area], in KOTJABOPOULOU E., HAMILAKIS Y., HALSTEAD P. & GAMBLE C. (eds), *Zooarchaeology in Greece: Recent Advance*. David Brown Book Company, Oxford: 91-102.
- OUSTALET M. E. 1895. — Les mammifères et oiseaux des îles Mariannes. *Nouvelles Archives du Muséum d'Histoire naturelle* 7: 140-228.
- PARKER B. J., CREEKMORE A., CAVALLO C. & MALIEPPARD R. 2002. — The Upper Tigris Archaeological Research Project (UTARP): a final report from the 1999 field season. *Anatolian Studies* 52: 56-59. <https://doi.org/10.2307/3643077>
- PECORELLA P. E. 1975. — *Malatya III. Rapporto preliminare delle campagne 1963-1968. Il livello eteo imperiale e quelli neoetei*. Centro per le Antichità e la Storia dell'Arte del Vicino Oriente, Rome, 144 p.
- PERRY-GAL L., ERLICH E., GILBOA A. & BAR-OZ G. 2015. — Earliest economic exploitation of chicken outside East Asia: evidence from the Hellenistic Southern Levant. *Proceedings of the National Academy of Science of the United States of America* 112 (32): 9849-9854. <https://doi.org/10.1073/pnas.1504236112>
- PETERS J. 1997. — Zum Stand der Hühnerhaltung in der Antike. *Beiträge zur Archäozoologie und Prähistorischen Anthropologie* 1: 42-58.
- PETERS J., PÖLLATH N. & DRIESCH A. VON DEN 2002. — Early and Late Bronze Age transitional subsistence at Tall al'Umayri, in HERR L. G., CLARK D. R., YOUNKER R. W. & LABIANCA Ø. S. (eds), *Madaba Plains Project 5: The 1994 season at Tall al'Umayri and Subsequent Studies*. Andrews University Press, Berrien Springs: 305-347.
- PETERS J., LEBRASSEUR O., DENG H. & LARSON G. 2016. — Holocene cultural history of Red jungle fowl (*Gallus gallus*) and its domestic descendant in East Asia. *Quaternary Science Reviews* 142: 102-119. <https://doi.org/10.1016/j.quascirev.2016.04.004>
- POLLARD J. 1977. — *Birds in Greek Life and Myth*. Thames & Hudson, London, 224 p.
- REDDING R. W. 2015. — The pig and the chicken in the Middle East: modeling human subsistence. Behavior in the archaeological record using historical and animal husbandry data. *Journal of Archaeological Research* 23 (4): 325-366. <https://doi.org/10.1007/s10814-015-9083-2>
- SALONEN A. 1973. — Vögel und Vogelfang in alten Mesopotamien. *Annales Academiae Scientiarum Fennicae Ser. B* 180, 374 p.
- SIRACUSANO G. 2012. — An amazing discovery at Arslantepe (East Anatolia): unusual find of a cheetah in an EBA III level, in LEFÈVRE C. (ed.), Proceedings of the general session of the 11th International Council for Archaeozoology conference (Paris, 23-28 August 2010). *British Archaeological Report International Series* 2354: 1-17.
- SIRACUSANO G. (in press). — From shepherds to farmers at Arslantepe (Eastern Turkey) during Early Bronze Age II and III, from 2750 to 2000 BC, in Proceedings of the ASWA[AA] XIVth international meeting, 3-7 June 2019, Barcelona. *BAR International Series*.
- SIRACUSANO G. & BARTOSIEWICZ L. 2012. — Meat consumption and sheep/goat exploitation in centralised and non-centralised economies at Arslantepe, Anatolia. *Origini* 34: 111-123.
- STEBER M. 1986. — *Tierknochenfunde vom Takht-i Suleiman in der iranischen Provinz Azerbaidjan (Grabungen 1970-1978)*. PhD Dissertation, Ludwig-Maximilians-Universität München, 179 p.
- THESING R. 1977. — *Die Größenentwicklung des Haushuhnes in vor- und frühgeschichtlicher Zeit*. MA. Dissertation, Ludwig-Maximilians-Universität München, 62 p.
- THOMPSON D'ARCY W. 1895. — *A Glossary of Greek Birds*. Clarendon Press, Oxford, 206 p.
- TOMEK T. & BOCHENSKI Z. M. 2009. — *A Key for the Identification of Domestic Bird Bones in Europe: Galliformes and Columbiformes*. Polish Academy of Sciences, Krakow, 101 p.
- TOYNBEE J. M. C. 1973. — *Animals in Roman Life and Art*. Cornell University Press, Ithaca, New York, 431 p.
- VILA E. 1994. — Les vestiges animaux de l'habitat hellénistique d'Eleutherna, in KALPAXIS T., FURTWÄNGLER A. & SCHNAPP A. (eds), *Ελεύθερνα. Τομέας II. 2, Ένα ελληνιστικό σπίτι («Σπίτι Α») στη θέση Νησί. [Eleftherna. Sector II. 2, A Hellenistic house ("House A") at Nisi]*. University of Crete, Istitouto Mesogeiakōn Spoudōn, Rethymnon: 193.
- VILA E. & GOURICHON L. 2007. — Apport de l'étude de la faune mammalienne et de l'avifaune à la réflexion sur l'environnement de Qatna à l'âge du bronze et à l'âge du fer, in MORANDI

- BONACOSI D. (ed.), *Urban and Natural Landscapes of an Ancient Syrian Capital: Settlement and Environment at Tell Mishrifeh/Qatna and in Central-Western Syria. Studi archeologici di Qatna 1*. Forum Edizioni, Udine: 145-152.
- WATSON G. E. 2002. — Birds. Evidence from wall paintings, mosaics, sculpture, skeletal remains, and ancient authors, in FEEMSTER JASHEMSKI W. & MEYER F. G. (eds), *The Natural History of Pompeii*. Cambridge University Press, Cambridge: 357-400.
- WONG G. K. 2004. — A genetic variation map for chicken with 2.8 million single-nucleotide polymorphisms. *Nature* 432: 717-722. <https://doi.org/10.1038/nature03156>
- WOOD-GUSH D. G. M. 1985. — Domestication, in CAMPBELL B. & LACK E. (eds), *A Dictionary of Birds*. Poyser T. & Poyser A. D., Calton: 152-154.
- XIANG H., GAO J., YU B., ZHOU H., CAI D., ZHANG Y., CHEN X., WANG X., HOFREITER M. & ZHAO X. 2014. — Early Holocene chicken domestication in northern China. *Proceedings of the National Academy of Sciences of the United States of America* 111 (49): 17564-17569. <https://doi.org/10.1073/pnas.1411882111>
- ZEDER M. A. & ARTER S. R. 1994. — Changing patterns of animal utilization at ancient Gordion. *Paléorient* 20 (2): 105-118. <https://doi.org/10.3406/paleo.1994.963>

*Submitted on 16 June 2020;
accepted on 26 October 2020;
published on 19 November 2021.*